HD
9087
B7
P41

FEDERATION OF BRITISH INDUSTRIES
INTELLIGENCE DEPARTMENT

COTTON
IN
BRITISH WEST AFRICA

N. M. PENZER, B.A., F.R.G.S., F.G.S.
WITH AN INTRODUCTION BY
THE RT. HON. THE VISCOUNT MILNER
P.C., G.C.B., G.C.M.G.

Q 321
E 28

Cornell University Library
HD 9087.B7P41

Cotton in British West Africa, including

3 1924 013 849 173

mann

Cornell University
Library

The original of this book is in
the Cornell University Library.

There are no known copyright restrictions in
the United States on the use of the text.

http://www.archive.org/details/cu31924013849173

COTTON IN BRITISH WEST AFRICA

0

FEDERATION OF BRITISH INDUSTRIES
INTELLIGENCE DEPARTMENT

COTTON
IN BRITISH WEST AFRICA
INCLUDING
TOGOLAND AND THE CAMEROONS

orman

BY
N. M. PENZER, B.A., F.R.G.S., F.G.S.,

with an introduction by
The Rt. Hon. THE VISCOUNT MILNER
P.C., G.C.B., G.C.M.G.
His Majesty's Secretary of State for the Colonies

Publishers :
THE FEDERATION OF BRITISH INDUSTRIES
39, ST. JAMES'S STREET, LONDON, S.W. 1
Copies may be purchased of
THOMAS MURBY & CO.,
1, FLEET LANE, LUDGATE CIRCUS, LONDON, E.C. 4

1920

Contents

378204

PAGE

Section I.—HISTORICAL SKETCH 7

Tracing the industry from the earliest records up to 1860 in the whole of West Africa, and giving an outline sketch of the work of the British Cotton Growing Association in British West Africa from its foundation in 1902 up to date.

Section II.—NIGERIA 15

- (A) General.
- (B) Methods of Cultivation and Varieties of Cotton.
- (C) The Local Industry.
- (D) Transport.
- (E) Diseases and Pests.

Section III.—THE OTHER BRITISH COLONIES ... 21

- (A) Gold Coast.
- (B) Sierra Leone.
- (C) Gambia.

Giving general geographical and historical details, with notes on the development of the industry and methods of cultivation.

Section IV.—THE LATE GERMAN COLONIES ... 26

- (A) Togoland.
  - (i.) Geographical and General.
  - (ii.) Historical.
  - (iii.) Varieties.
  - (iv.) Statistics.
- (B) Cameroons.

Geographical details, with notes on development of the industry up to 1912.

Section V.—THE LAKE CHAD DISTRICT ... 32

Section VI. THE FUTURE OF COTTON GROWN IN BRITISH WEST AFRICA 38

Section VII.—GENERAL STATISTICS 41

Section VIII.—BIBLIOGRAPHY 44

Special Introduction

By LORD MILNER

THE necessity for the development of the supply of raw materials from within the British Empire can hardly be over-estimated. Although it is now many years since Mr. Joseph Chamberlain first pointed out what boundless possibilities our Colonies offered, and what little advantage had been taken of them, it still needed the late War to awake us to the great importance and potentialities of our Colonies. Practically all the Colonies under direct Imperial control are, from a European point of view, backward countries. We must look upon ourselves as trustees and take every opportunity to develop to the fullest extent the natural resources of these countries.

Opportunities for the increased production of raw materials within the Empire exist on every hand. There are many Colonies, three or four times as big as the British Isles, whose natural resources are still practically untouched. This is the case in every Continent. The minerals of such countries as Nigeria, the late German Colonies in East and West Africa, and further east in Burma, have hardly been exploited at all, while new regions capable of producing oils and fats and cotton are still being discovered.

This being the case, it is plainly of great importance to collect in a handy and comprehensive form all that is known up to the present of the resources in raw material of any of our Colonies.

The Federation of British Industries has realised the necessity for collecting such information, and is issuing short memoranda on various important raw materials in different parts of the British Empire. One such memorandum has already been issued dealing with Rubber in Malaya. A second, dealing with Cotton in West Africa, is now offered to the public. The information contained in it relates not only to the British Colonies in West Africa, but to the late German Colonies, Togoland, and the Cameroons. As in the case of "Rubber in Malaya" a fairly complete bibliography has been added. The importance of a good bibliography is self-evident, and I trust that the F.B.I. will continue to make this a feature of any further memoranda which it may issue.

Our manufacturing industries at home are in constant need of raw materials. This is peculiarly the case with cotton; indeed the world is threatened with a great shortage of this staple, and in many other industries the amount of raw material required is increasing day by day. The demand is great, not only in our own country, but on the part of our Allies, and our late enemies as well. They all look to the British Empire to supply them, and it is obviously of the first importance that we should meet their demand to the utmost of our power. The United States, our principal creditor, is at the same time a great customer for raw materials, which our Colonies can supply. The significance of this fact, as a factor in re-establishing the balance of trade between the United States and the Empire, can hardly be overestimated. But when dwelling upon the great potentialities of the Empire in this respect, we must always bear in mind that a vigorous policy of development is necessary if we are to realise them. British capital must be forthcoming for this purpose, and especially for equipping the Colonies with adequate means of transportation, roads, railways and ports.

For these reasons I feel that the F.B.I. is doing a work of national importance in directing the attention of its members to those areas within the Empire from which an abundant supply of raw materials of the greatest value can be derived.

Milner

COTTON
IN BRITISH WEST AFRICA

Section I

HISTORICAL SKETCH

FROM time immemorial Africa has been one of the homes of the Cotton Plant. The first record we have of African cotton is through the pen of a Moor, Al Hassan Ibn Mahommed al Wezaz al Fusi, better known as Leo Africanus. Born at Granada in Spain in 1494, he explored the basin of the Niger, was captured by pirates and sold into slavery, but obtained his freedom from Pope Leo X. on his accepting Christianity. In his famous "Description of Africa" he mentions that cotton was grown in what we now call Nigeria. In describing the Kingdom of "Ghinea" (Guinea) he tells us that it "extendeth two hundred and fiftie miles along the Rieur of Niger, and bordereth vpon the Ocean Sea in the same place, where Niger falleth into the saide sea. This place exceedingly aboundeth with barlie, rice, cattell, fishes, and cotton: and their cotton they sell vnto the merchants of Barbarie, for cloth of Europe, for brazen vessels, for armour and other such commodities . . . . . the inhabitants are clad in blacke or blew cotton, wherewith they couer their heads also: but the priests and doctors of their law go apparelled in white cotton."

The cotton plant grows wild in Nigeria, Gold Coast, Senegal, Angola and other parts of West as well as East Africa. The cotton tree (Eriodendron anfractuosum) producing the "Kapok" of commerce, is to be found throughout Tropical West Africa, and the "bombax" (B. reflexum and Buonopoz), producing a similar floss to "Kapok" also occurs commonly in West Africa.

Although India is the supposed birthplace of cotton manufacture, the inhabitants of the Western and Southern coasts of Africa made cotton garments long before they were imported into the country. The beauty of the colours and design of the native cotton dresses have frequently been commented on by the early explorers. In the neighbourhood of Sierra Leone, Liberia, Lagos, the island of Fernando Po, and in the interior of Africa, cotton has, for centuries, been manufactured. From Macpherson's "Annuals" it appears that cotton, woven on the "coast of Guinea," was imported to London from the Bight of Benin, in the year 1590.

The Beginning of the British African Cotton Trade

The first voyages of the British to Benin and Guinea Coast were made by two vessels sailing from Portsmouth in 1553; in 1618 an African Company was formed, not originally with the object of trafficking in slaves, though in 1631 it degenerated into this, and the slave trade was carried on in British vessels.

Owing to the large demand for cotton robes created by the Mahommedan races who live there, Northern Nigeria has been the centre of the cotton industry. The cotton was ginned by hand, or by very primitive means, spun into yarn and woven on very simple looms into the so-called "country cloths," that is to say, narrow strips of cloth which have to be sown together to make cloths of any size. These stuffs are very durable, and are ornamented by the use of dyed yarns. What was not needed for local requirements was exported by river and caravan as far north as the Mediterranean.

Kano used to be the great cotton market, and bought up all the cotton from the neighbouring countries. The prices paid at Kano were often twice as great as what was paid for cotton at Liverpool.

Mr. Thomas Clegg, a Manchester merchant, was the first to carry on profitable trade with West Africa. He encouraged the natives to grow cotton and hoped by giving them employment to discourage the slave traffic, as well as to increase England's supply of raw material. His experiment was first confined to the district round Sierra Leone, and was afterwards extended to the interior cotton fields, and the residences of the chiefs about Abeokuta. In 1851 he imported 285 lbs. of cotton, by 1853 the imports had risen to 37 bales, whereas in 1859, 3,500 bales were imported. (100 to 120 lbs. a bale).

Mr. Macgregor Laird also took great interest in the cotton producing possibilities of the country. In 1857 he tried to establish trading stations on the river Niger, but his enterprise was not successful owing to the bad climatic conditions, and to native opposition.

By 1860 Lagos had become the largest cotton port of West Africa. Formerly it had been a slave mart, but the traders were dispelled by Commodore Bruce, and it became an open port for legitimate commerce. The country round is well adapted for the growth of cotton, and the Yoruba inhabitants of the district are enterprising and skilled in local trade, while the Hausa is, as is well known, the travelling merchant trading between Nigeria and the Mediterranean.

In January, 1901, Mr. Benjamin Crapper pointed out to the Oldham Chamber of Commerce the dangerous position of the Lancashire cotton trade. The failure of the American cotton crop, on which England was almost entirely dependent for her raw material, would be disastrous to the industry. Such an event could be avoided by the establishment of cotton growing in different parts of the world, preferably in the British Colonies, so as to render the industry more or less independent of American supplies. A committee appointed by the Oldham Chamber of Commerce to consider the question reported in November, 1901, that various parts of the Empire were suitable for the cultivation of cotton for the Lancashire trade.

British Cotton Growing Association Formed

At a meeting of representatives of various Chambers of Commerce, held in February, 1902, a committee was appointed to discuss the matter, and in May of the same year, at a dinner of West African merchants, held in Manchester, the British Cotton Growing Association was formed. It was formally inaugurated on June 12th, 1902, at a meeting of the various bodies interested, with a guarantee fund of £50,000. The late Sir Alfred Jones, who had already sent out 10 tons of American seed to West Africa on his own account, was elected President.

Experts were at once dispatched to various parts of the Empire to investigate, and it was soon realised by the General Committee of the Association that it would have to extend its original scheme of experimental and research work, if the enterprise were to be a success, and undertake the entire supervision of the industry. Its funds, however, were found to be inadequate for its purposes, and the Guarantee Fund was raised to £100,000.

In 1904, owing to unfavourable climatic conditions, the American crop was a small one, being only 10,124,000 bales, which was much short of the world's requirements, and this enabled speculators to "corner" the crop, the most notable being Mr. Sully, who was known as the great wheat operator. Naturally, with a shortage of American cotton, the American mills were the first to get supplies, and Lancashire and the outside mills had to take what was left, which was too little to go round. This necessitated working short time, with the result that there was considerable anxiety and some distress amongst the operatives. It was therefore decided to reconstitute the Association on a permanent basis, with a capital of £500,000, and to apply for a Royal Charter, which was finally sealed on August 27th, 1904. The Association did not expect any profits from its work for some time—it was indeed stipulated that no dividends should be paid for 7 years—as pioneering work would be necessary for a considerable period, and consequently some difficulty was found in raising the capital.

The Association consists of spinners, manufactures, merchants, shippers, and representatives of the various industries and Labour bodies connected with the cotton trade.

It has received assistance from the Government in the way of monetary grants, given firstly from the local Governments on the condition that the Association should spend an equal amount on cotton growing and experimental work, and latterly by the Imperial Treasury on condition that the money should be spent in special districts approved of by the Government, which recognised the value of the work undertaken both in developing the resources of the colonies and in giving the Government the benefit of its experience in all matters where its advice can be of use.

Some of the islands of the West Indies, whose finances at one time were dependent upon Imperial grants, became very prosperous owing to the work of the Association.

Cotton is now the chief product exported from Uganda and the second largest in Nyasaland, while in Nigeria a large proportion of the revenue of the country is derived from cotton.

The Empire Cotton Fields

The principal Empire cotton fields are India and Egypt (which are the producers of several million bales of cotton), the Sudan, Nigeria, Uganda, Nyasaland, and the West Indies, all of which have now passed the experimental stage, and the Association's work now consists in developing these countries, and is therefore concentrating its efforts upon them.

The lack of Agricultural Departments in West Africa from which particulars as to the areas suitable for cotton, etc., could be obtained was a great handicap to the work of the Association, as all information of this sort had to be collected by the Association itself before any start could be made. This meant the expenditure of a great deal of money and waste of time, which would otherwise have been avoided. British West Africa comprises about 450,000 square miles, a very large area to investigate, and the population is about 20,000,000.

The first step taken by the Association was to send out to all the West African colonies a number of American planters, who reported that cotton of fair quality grew wild, and that a certain amount was grown for local consumption in some districts. A great difficulty in the way of development in West Africa is the climate, which makes it impossible for Europeans to work there without long and frequent intervals of leave; the cost of passages to and from England is consequently heavy, and as the salaries paid are high, the Association found it difficult to work large plantations economically. For this reason, and because the natives work better on their own land than they do on European plantations, it was decided to encourage and assist the natives to grow their own crops, rather than to start large plantations under English management.

The Establishment of Model Farms

It requires three or four years' work to discover whether exotic varieties of cotton are likely to flourish in a new country, and which particular areas are most suitable to the different varieties; therefore in 1904 an agreement was made with the Government to establish model farms for the purpose of experimenting with different varieties of seed, and ultimately distributing the varieties found most suitable, the cost of which was to be borne by the local government. The Association undertook to buy all seed cotton offered for a period of three years, at a minimum price first of ¾d. and later of 1d. per lb., and to send experts to travel round the country and encourage the natives to grow cotton. Later, this agreement was modified, the Association taking over the experimental work at the plantations, in return for a grant of £6,500 per annum from the Governments of Sierra Leone, Lagos, and Southern Nigeria; the Association was to spend £10,000 annually in experimental work in each of the three colonies.

Plantations, from a commercial point of view, did not pay, but the results of the experiments made were valuable. It was found that it was better to start with local varieties of cotton than to distribute exotic seed which had not been established; if the local varieties were unsatisfactory in quality they could subsequently be replaced by American or Egyptian seed, which could, after a certain number of years, be established so as to give good results. Some of the best results were obtained from Upland American seed.

The Association, finding it was unwise to distribute exotic seed, endeavoured to improve the local varieties by selection; this was done in bulk at the ginneries. Samples were sent home from each lot of cotton, and instructions sent out to reserve certain lots for sowing purposes, and to destroy or ship home the seed from undesirable cotton. This method, though unscientific, has proved very satisfactory in Lagos; the Association control and bear the cost of the distribution of seed.

There was at first a very great variation in the quality, and the cotton was difficult to sell; its usual price being about one penny per pound below Middling American. Efforts made by the Association to improve the quality by selection, by having the ginneries in their own hands, resulted in the African cotton showing considerable improvement during the last few years, and it is sold to-day at prices ranging from "Pass" to one halfpenny per pound on Middling American. Unfortunately the ginning outturn of West African cotton is only 27 per cent.: in other words, it requires 3¾ lbs. of seed cotton to yield 1 lb. of lint. The yield per acre was also low. An effort was therefore made to try and establish a variety of cotton which would give the grower a larger production per acre, together with a larger percentage of lint. With this aim in view steps have been taken by the agricultural authorities in Northern Nigeria, under the supervision of Mr. Lamb, the Director. At first a few bales were produced, the seed of which next season was distributed, and so on, until in 1918 over 2,000 bales of excellent cotton have been grown in Northern Nigeria. This cotton gives a lint percentage of about 30 per cent., has a larger production per acre, and is worth to-day about two pence per pound on Middling American, which enables the Association to pay the grower one halfpenny per pound more for his seed cotton than for the native variety. Another disadvantage of West African native cotton is that it is rough and harsh with a brown colour; it is, however, very strong, and were it a bit longer and whiter, there would not be the same necessity for its improvement. At the moment all hope lies in the further extension of the exotic variety, as this is just the class of cotton required by Lancashire, and has the most ready sale.

The local Governments of the West African Colonies subsequently decided to take over the experimental farms, and the Imperial Government undertook to pay the Association a grant of £10,000 per annum, for a period of three years, ending March 31st, 1913. Later, this was extended to March 31st, 1916; the grant was given on condition that the Association raised £150,000 additional capital, and maintained two ginning and buying stations in the Gold Coast (Labolabo and Tamale), one in Southern Nigeria (Illushi), three in Northern Nigeria (Lokoja, Zaria and Kano), and one in Nyasaland (Port Herald). The Association also promised to distribute seed free of charge in these Colonies, and Lagos, and to allow their staff to give up part of their time to missionary work; the cost of distributing seed is considerable, amounting in 1913 to £1,700 in Lagos alone.

In the early days of the war, and before the issue of paper money, various Government departments set about in rather a panicky manner to cut down what appeared to them unnecessary expenditure, *i.e.* expenditure not giving an immediate return; consequently the grant was not renewed. A deputation from the Association, however, interviewed Mr. Bonar Law, the then Colonial Secretary, to request the Government to make a grant of £1,000 if only to show that the authorities were continuing their sympathy with the movement. This £1,000 was given for one year only.

An agreement was entered into with the large number of merchants established in West Africa to purchase all cotton offered on account of the Association, who were thus saved the expense of a special staff for buying cotton. The Banks have also been of great assistance to the Association, for thereby it has been possible to obtain all the cash required. This is an important consideration, for all cotton has to be paid for in cash.

The chief difficulty in the way of the Association in Africa is the inadequate means of transport. The dryer lands in the Interior are the most suitable for cotton; as a rule, the rivers are too low to be of use at the time when they are most needed for the transport of the cotton to the coast, and until the Colonies are opened up by railways, cotton growing cannot, in the opinion of the Association, be really successful. Much has already been done in this direction, and a new railway is now in course of construction. African railways pay well, and the direct and indirect benefits of railway construction to the Colonies are enormous.

The first saw ginning factory was erected at Ibadan in 1905, and the Association found it far more economical to erect large ginneries than small ones. The lint when conveyed in lightly-pressed bales to a central baling factory, was often stained and damaged, but when efficiently packed at the ginnery by a hydraulic baling press, it is far less easily damaged; it is, of course, impossible to have a powerful hydraulic press at each small ginnery. It is more expensive to convey the seed cotton long distances to the large ginneries than to have small ones established in many places, but, on the other hand, it is cheaper to handle the larger well-pressed bales turned out by the large factories.

In the Association's ginneries, the cotton is conveyed automatically by pneumatic feed to the gins, of which there are four in each battery and two batteries in a ginnery. There are seventy saws in each gin; from the gin the cotton is taken to the press, which turns out eight bales of 400 lbs. of lint cotton per hour and about 12,000 bales in the season. The weight of the bales is regulated by an electric attachment so that it is absolutely accurate. The bales measure 80 cubic feet to the ton weight; this gives a density of 28 lbs. per cubic foot. The standard weight of 400 lbs was adopted because bales of a heavier weight are more difficult to handle.

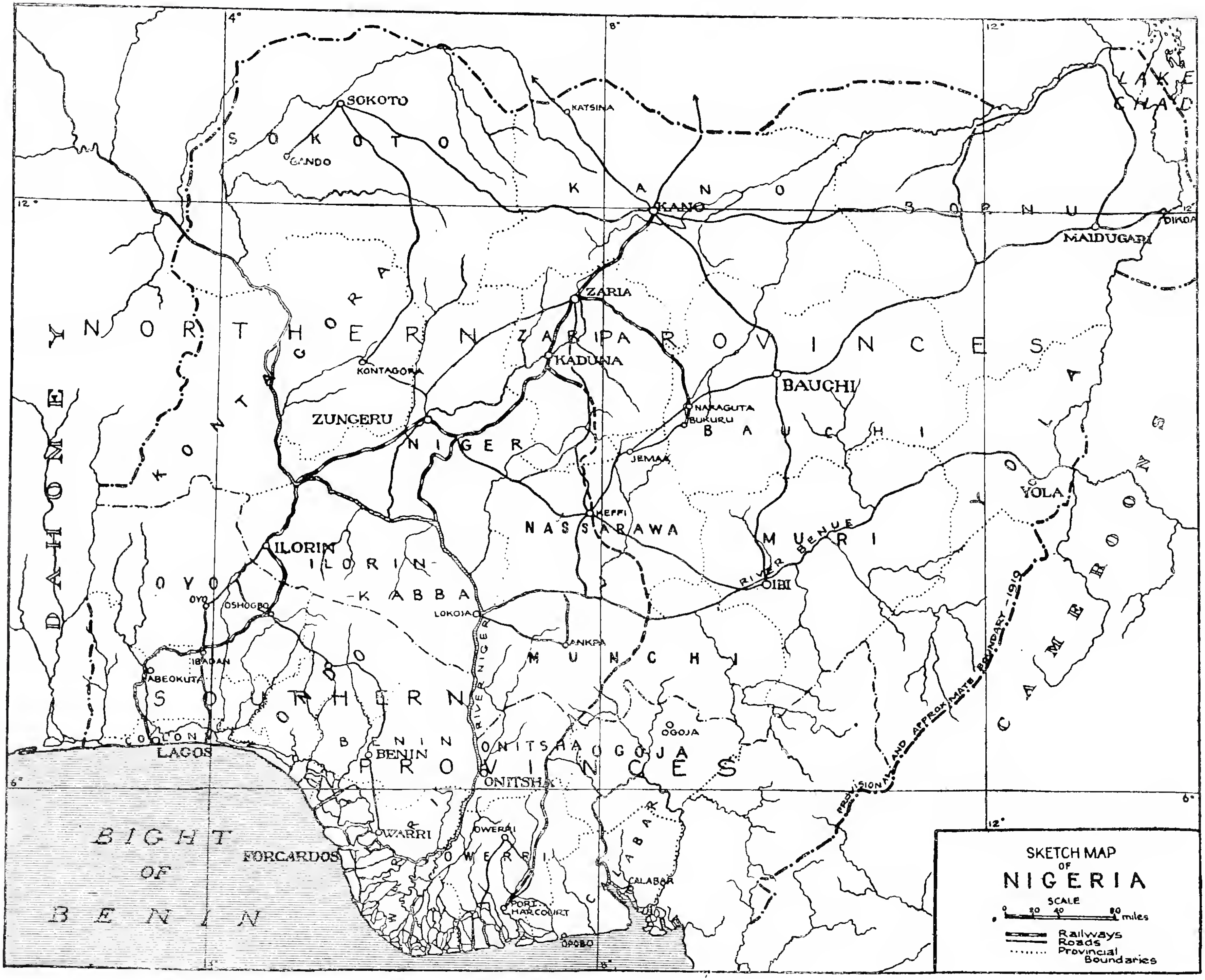
Two or three four-cylinder gas engines of the vertical type, each of 100-h.p., are generally used; the gas is obtained from cotton seed, which has little value owing to the high freight home, whereas coal or oil would be very expensive. The cotton is usually stored unginned for a short time after picking, as this is said to improve it.

The seed is conveyed to hoppers, where it is weighed automatically as it is stacked. The Association erected as an experiment a small oil-mill plant at Ibadan for the purposes of extracting the oil from cotton seed; but it was found that there was no local demand for the cake or the oil. It was found more economical to ship the seed for sale to English crushers.

On the whole, the work of the Association in West Africa, apart from Nigeria, has not been altogether a success. In Gambia the natives preferred to grow ground nuts rather than cotton; the heavy rainfall makes Sierra Leone unsuitable, and in the Gold Coast cocoa was more profitable to the natives than cotton. Nigeria is now the only British Colony in West Africa in which cotton is grown successfully.

The Southern Provinces have so far been the most satisfactory in view of the fact that Northern Nigeria has only recently been opened up by a railway; the Southern Provinces also are rich in the palm oil trade and no large quantity of cotton can ever be expected from them. It is more from Northern Nigeria, which has an area capable of growing several million bales of cotton, that the Association expects its best results.

When war broke out and the price of American cotton slumped to fourpence per pound, the Association was faced with a very serious problem. They felt, however, that the time had arrived when they should take their courage in both hands, and they therefore guaranteed a buying price to the natives, which in spite of getting a reduction in railway freight from the Government and also from the Steamship Company, was likely to show them a serious loss; but this price was such as to encourage the natives to continue to grow cotton. Fortunately, the market conditions at home improved and the Association's losses were not so great as were at one time feared. Great credit is due to the West African merchants who are the Association's buying agents, for the loyal way in which they came forward and assisted them during this very trying period. In Northern Nigeria considerable quantities of cotton are used locally and there have been recently times when the local consumption was so great that the spinners and weavers could afford to pay a higher price for the cotton than the Association. This, however, is mainly brought about through the difficulty in obtaining European goods both on account of the shortage and to the high prices for same.


4°
8°
12°
12°
12°
12°
6°
6°
4°
8°
SOKOTO
KATSINA
LAKE CHAD
SOKOTO
GANDO
KANO
KANO
BORNU
DIKOA
MAIDUGARI
ZARIA
NORTHERN PROVINCES
KONTAGORA
KONTAGORA
ZARIA
KADUNA
BAUCHI
NARAGUTA
BUKURU
BAUCHI
ZUNGERU
NIGER
JEMAA
YOLA
YOLA
KEFFI
NASSARAWA
MURI
RIVER BENUE
IBI
DAHOMEY
ILORIN
ILORIN
OYO
OYO
OSHOGBO
KABBA
LOKOJA
ANKPA
MUNCHI
IBADAN
ABEOKUTA
SOUTHERN PROVINCES
COLONY
LAGOS
BENIN
BENIN
RIVER NIGER
ONITSHA
ONITSHA
OGOJA
OGOJA
CAMEROONS
PROVISIONAL AND APPROXIMATE BOUNDARY 1919
WARRI
WARRI
OWERRI
OWERRI
CALABAR
CALABAR
PORT HARCOURT
OPOBO
FORCADOS
BIGHT OF BENIN
SKETCH MAP OF NIGERIA
SCALE
0 20 40 80 miles
Railways
Roads
Provincial Boundaries

Section II

NIGERIA

(a) General

NIGERIA was formerly under separate administrations, but on January 1st, 1914, it was known under the comprehensive title of "The Colony and Protectorate of Nigeria," and was divided into two groups of provinces, the northern and the southern, each under a Lieut-Governor appointed by the King, and subject to the Governor-General, by whom the whole country is governed.

Nigeria is bounded on the north by French West Africa, on the south by the Gulf of Guinea, on the east by the French Equatorial Africa and Cameroons, and on the west by Dahomey.

The area is roughly 335,000 square miles, and the population estimated at 18,000,000.

The rainfall is very variable, ranging from about 28 ins. in the Northern Provinces to over 150 ins. in the Delta Region. The rainy season extends from April to October, and in the Southern Provinces the rainfall gets lighter after July. The average temperature in Southern Nigeria is 78·5 deg., and that of Northern Nigeria is 80 deg. In the winter a hot dry wind called "Harmattan" blows across Nigeria from the Sahara, bringing with it fine dry dust, which produces a hazy atmosphere. The adverse influence of this wind on the crops is shown by the fact that should it begin when the rainy season closes and continue blowing, the size of the crop will be very greatly lessened.

Much has been written upon the climate of Nigeria, especially on unhealthiness of the Southern Provinces, due to the prevalence of the most malignant form of malaria and of black-water fever. Of recent years, however, since the mosquito-borne character of malaria has been better understood by Europeans inhabiting Tropical Africa, and the importance of mosquito-net precautions and quinine prophylaxis better realised, it has become evident that Europeans can live in Nigeria, as in other malarial regions of West Africa, for lengthened periods without greatly suffering in health, if at all, provided facilities for travel and recuperation are allowed at intervals.

The most important river of Nigeria is the Niger which flows roughly south-east throughout the whole of the Protectorate. It is joined about 250 miles from its mouth by the Benue which rises in the Cameroons. The Niger is navigable as far as Jebba, while most of its tributaries are navigable for their entire length in wet weather. The river Cross in the south-east corner of Nigeria, although only small as compared with the Niger, is very important since it carries a very large amount of trade to Calabar. In the wet months it is navigable as far as the (1914) German frontier.

The North of Nigeria is well adapted for wheeled transport and there are a number of good roads; also motor transport routes from Kano to Katsena, and Zaria to Sokoto and Ibadan to Oyo.

The Railways are inadequate for the needs of the country. The chief line runs from the Port of Lagos to Jebba and from thence to Kano. There is a branch line from Baro which joins the railway just north of Zungeru ; another line runs south-east of Zaria to Bukuru. There is a line from the new Port Harcourt to the Udi coalfields. The war, however, postponed any further development.

A small quantity of cotton is now being produced in the Abakaliki district, about 30 miles east of the Udi coalfields. It is probable that a ginnery will be erected when the railway from Port Harcourt to Udi has been extended further inland.

The chief ports of Nigeria are Lagos, Forcados and Port Harcourt. Lagos, the most westerly of these, is the terminus of the main line of the railway. The port has recently been improved on, and it is used by ocean-going steamers. Forcados lies on an effluent of the Niger, the channel is so small that at some seasons of the year it can only be used by small steamers. Port Harcourt is a new port built round a natural harbour formed by the Bonny river, thirty-eight miles from the sea.

The cotton growing part of Nigeria is mostly confined to those districts which are in communication with the railway, rivers and the coast.

The best cotton growing area may, however, be found in part of Western Sudan and the Chad regions. The soil is specially adapted to its cultivation, and two cotton crops could probably be harvested a year, one by irrigation and one in the rainy season. An extension of the railway from Kano to Lake Chad would open up extensive additional cotton-growing areas in the Chad area.

(b) Methods of Cultivation and Varieties of Cotton

THE native methods of cultivation vary considerably. The cotton is grown in some places as an annual crop, in others it is left in the ground for three years, and again in some places it is left till the crop is so small that it is not worth harvesting and the plantation is then abandoned.

Cotton and yam are sometimes grown in conjunction. The former can be planted when other crops are well on to maturity and it matures when other crops are harvested, which ensures to a certain extent the popularity of its cultivation.

The planting season is from the middle of June to the end of July. The land is first carefully prepared, then the cotton is planted in ridges, every hole fifteen inches apart, with five seeds, in thinning reduced to three, in each hole. The rows are three or four feet apart, according as to whether the cotton is American or native, and the land is kept clean by weeding or cultivation four or five times during the season. The picking begins in November or December and may continue as late as April or May.

In 1888 the Niger Company sent samples of indigenous cotton to England, and these were found to be of rough but useful staple.

The Upland, Sea Island and Egyptian varieties of cotton seed have been tried in Nigeria; the most successful of these is the American Upland, which is similar to the native variety.

In 1913 an American variety of seed, known as "Allen's Long Staple" was experimented with on the Government plantations near Zaria. In 1914 this variety was distributed to the growers for cultivation, and was found to give a larger yield and ginning out-turn than the native variety, and the British Cotton Growing Association was able to pay 1½ per lb. for the seed cotton, while the native cotton was only worth 1 per lb.

Since then good progress has been made in extending the cultivation of American long staple cotton in the northern cotton districts.

In 1918, 311 tons of this seed were distributed by the Agricultural Department, and 2,000 bales of long staple cotton were purchased. The seed cotton was sold for 2¾d. per lb., so that the whole crop represented the sum of £27,000 in the hands of the native growers, mostly in the Zaria province.

Even the native spinner is beginning to prefer long staple cotton to the native variety, and the local weaving industry has been using more cotton of local production, being stimulated thereto by the higher prices realised by manufactured cloth. Owing to these facts it has been noticed that the number of bales of cotton brought in for sale does not increase in proportion to the seed distributed.

The result of the introduction of "Allen's Long Staple" has therefore been proved most successful. At the Maigana Experimental Farm work is being continued with a view to the improvement of the local strain of Allen cotton by selection, so that the yield may be increased, and the quality of the staple improved.

The efforts of the B.C.G.A. and the Agricultural Department to secure uniformity and prevent hybridising have been furthered by legislation, which prohibits the growing of any other variety of cotton in the districts into which "Allen's" has been introduced, and in which all seed required by the natives is distributed free.

Since the introduction of "Allen's Long Staple," the quantity grown by the natives in 400 lb. bales is:—

1914	1915	1916	1917	1918
11	24	121	433	855

The Agricultural Department of the Southern Provinces has specialised in a medium stapled Upland known as "Georgia," which was distributed on a small scale in the Oyo Province. Owing, however, to the apathy of the farmers, the experiment met with but little success, and in 1917, the plant was tried at Meko, at which place, so far, reports are good.

(c) The Local Industry

THE local cotton industry is very important, as it has been estimated that about 70 per cent., or perhaps even more, of cotton produced in Nigeria is not exported but used for local consumption. It is bought by the natives, men, women, and children, and in the Kano bazaars it is a rare thing to see anything but native-made cloths worn. It is grown by the natives, spun by their wives, and again woven by themselves. Some of the cloths are of very fine texture and beautifully woven. At present Lancashire only sends very second-rate cloth to West Africa, and if a large trade is to be done with the natives a far finer cloth should be sent out, otherwise it can bear no comparison with their own production, which is far more durable and of much better quality than the imported stuff. Nigerian woven cotton (generally known as "Kano cloth") of a special type of weaving, in strips 18-in. to 2-ft. wide, is extensively used by Europeans for their clothes. If, as time goes on, railways become largely developed in Nigeria, and Northern Nigeria is opened up and brought into closer touch with the coast, there will be a competition between machine-made cotton and the hand-made cotton of the natives. It is fairly probable that in this case the native industry will in time be killed, although this time is far distant owing to the great extent of the local industry and the cheapness of production. The prices of Kano would then fluctuate with those of New Orleans and other large cotton centres. At present Northern Nigeria is quite self-contained and has a civilisation of its own, and whether such a state of things would be for the general good of the Colony is hard to say. With the native industry lost, as the native indigo and other industries have been lost, the natives would have to rely more and more on the imported articles.

* * * * *

The total quantity of cotton grown at present in Nigeria has been estimated at between 100,000 and 150,000 bales of 400 lbs.; this is more likely to be an under-estimate than an exaggeration.

(d) Transport

THE great drawback to the cultivation of cotton in Nigeria is the distance between the plantations and the markets. Most of the population live at very remote distances from the existing railways and the rivers, and the 2d. per lb. of seed cotton which is offered the farmers only pays them if they are within a day's reach of the market, not if they have to carry their crops on their heads for a hundred miles or so.

This grave difficulty of transport accounts for the non-realisation of the brilliant future which had been predicted for cotton growing in Nigeria.

At the present moment the farmer only plants about a hundredth part of an acre with cotton, instead of devoting a far larger portion of his land to its cultivation, as he would do if the markets were more accessible, for he is always most anxious to grow any saleable crop.

Thus it will be realised that the question of improving the means of transport, and establishing sufficient markets, is one of far reaching importance.

Railways and roads take years to build and involve heavy expenditure. The cheapest form of transport would be by canoe, but the carrying capacity is very small. Where unnavigable streams exist, pack-donkeys are substituted. This is at present the almost universal method of transport.

The necessary markets cannot be established, nor can the transport be organised without Government assistance, and it is suggested that native administrations should undertake this work, the expenses to be borne by them, as they have ample resources to draw upon.

(e) Diseases and Pests

THE following is a list of the chief diseases and pests affecting the cotton plant. It must, however, be borne in mind that different diseases and pests seem to affect the plants in different years. Thus, in one year a disease that is very common hardly occurs at all two years afterwards.

(1) DISEASES

Leaf Curl:

This disease is confined to native cotton, foreign and hybridised varieties being immune. It manifests itself by intumescences which occur on the under side of leaves, due to local access of spongy parenchyma. In severe cases infected plants are sterile and in all cases the flowering is restricted. The plants have not been known to recover.

Anthracnose :

Native cottons are susceptible to anthracnose (Colletotrichum Gossipii). American cotton and hybrids are very little subject to this disease. There is doubt as to the Nigerian anthracnose being the same as the American fungus. The first symptoms of the attack are on the bolls, which show a small reddish brown spot, depressed slightly in the centre. Seedlings and stems are liable to attack, but in Nigeria the leaves are immune. In plants otherwise healthy and strong the disease makes no progress.

Areolate Mildew :

Areolate Mildew (Ramulari Areolate) is common on American cotton, but rare on the native kinds.

Cotton Rust :

This is known as Uredo Gossypii. It is an enemy to the American varieties of cotton, but attacks also the other kinds.

(2) PESTS

Leaf Pests :

The cotton plant is attacked at an early stage by the larva of a small Tineid moth, still unidentified. The cotyledons are also attacked, in which case the vitality of the plant is impaired.

A species of Tetranychus, which bears a resemblance to the "red spider," is found later in the season in great numbers on the under side of leaves.

Early in the season the Cotton Aphides are abundant, but their activities are checked by their natural enemies—ladybirds.

In some seasons the leaf-rolling Pyralid caterpillar (Sylepta Derogata) occurs, but parasites keep him also in check.

The short-horned grasshopper, determined as Catanitops vittipes, is the worst pest attacking leaves. It is a black and green insect, the nymphs of which appear in great swarms in November and strip the foliage off entire plants.

Cotton Stem Pests :

Great damage is caused by the larva of a small green metallic looking beetle. It is a stem-borer and is, as yet, undetermined. Though the plant may survive the attack, its vitality is permanently impaired.

Another stem-borer comes from the larva of an Aegerial moth, possibly of the Eulophonotus species.

Pests attacking Roots :

Roots are attacked by the larva of a Lamellicorn beetle. The symptoms are a gradual withering of leaves, a premature opening of the bolls and the ultimate death of the plant.

Insects attacking Bolls :

There are four species of boll-worm. The first and commonest is the red boll-worm (Diparopsis Castanca), the larva of a nocteid moth. The eggs are found at the base of the bract, not more than two or three on a boll; they are also laid on young leaves.

The second species comes from the larva of the nocteid moth—Earras liplaya.

The third from the Tineid moth, Pyroderces simplex.

The fourth probably belongs to the Genus gnorimoschima. These do not attack unopened bolls.

Cotton Stainers :

The Pyrrhocorid bug, Dysderais superstitiosus, attacks developing bolls early in the season.

The mixed cultivation of cotton decreases the spread of insects. The hybrid cotton planted between belts of maize is relatively free from cotton pests as compared with that grown in open fields.

Section III

THE OTHER BRITISH COLONIES

(*a*) ***Gold Coast***
(*b*) ***Sierra Leone***
(*c*) ***Gambia***

(a) The Gold Coast

THE Gold Coast consists of the Colony itself, and of the two Dependencies of Ashanti and the Northern Territories. It has a coast line of 370 miles on the Gulf of Guinea and the total area is estimated at 82,000 square miles. On the west it is bordered by the French colony of the Ivory coast, on the north by French Sudan, and on the east by Togoland.

The climate is hot and moist, especially in the coast regions. In the interior the temperature is high, the humidity less and the country more open.

From December to March the "Harmattan" blows, and in March the rainy season begins which lasts till November.

About 70 per cent. or 80 per cent. of the country is covered with forests which have been divided under the four main types of rains, monsoon, swamp and savanna forests. The most open part of the interior is in the north-east.

Of the many tribes inhabiting the Gold Coast, the most important are the Fanti, the Ashanti, the Accra, the Apollonians, and the Akimand.

The British first took Koromantine in 1618, and in 1672 the African Society built forts along the coast. It was not, however, till 1874 that the British Government formed the Gold Coast Colony, and in 1894 the first Resident was appointed.

Agriculture is the main occupation of the natives in the interior, the most important industry in the coastal regions being that of the cultivation of cocoa.

Some experiments have been made in the cultivation of cotton in this region, first by the Government, then by the British Cotton Growing Association, but they were not considered sufficiently good to justify further expenditure. It was found that cocoa and other crops were more profitable to the natives in the districts where transport facilities were good, and where they were bad it was not profitable to cultivate cotton.

The natives of the Gold Coast do not, as a whole, appear to realise the value of cotton for cultivation. They make mats of woven grass and cloth by beating out strips of the fig-tree bark. The development of the industry has been retarded by the importation of finished cotton cloths from Europe.

The outer northern boundary of the dense forest region, and the Krepi country, east of the Volta river, are the only parts in which cotton is systematically cultivated, although scattered patches of the plant may be found near most villages. The inhabitants of the forest region are a mixed people, some of whom probable introduced cotton from the north, where it is a recognised field crop. The origin of cotton growing among the Krepi tribes is unknown.

In the middle of the last century an attempt was made to cultivate cotton for export, but it was a failure. The Government of the Gold Coast in 1903 started a plantation in the Krepi country at Anum, this was subsequently transferred to Labolabo, on the east bank of the Volta, as this was considered a better site. Native and American cotton was planted, and the natives were encouraged to grow cotton by an understanding that their crops would be purchased at 1d. a pound. This promise, however, could not be carried out, for no adequate arrangements were made to store and gin it. A great deal of it was taken to Togoland by the natives, who found that they could sell it there at a fair price. An arrangement was then made with a local firm to gin the cotton and prepare it for shipment, but the financial loss entailed was found to be heavy. The Government then asked for the assistance of the British Cotton Growing Association, who, in 1906, sent up three hand gins to Labolabo. Shortly after this the Association took over the whole plantation, and the Government paid it an annual grant to assist working.

Although in 1907 a steam power ginnery was set up, and the natives brought more cotton to Labolabo than they had hitherto done, it was reported that a considerable amount of cotton still went to Togoland, where the price was slightly higher than that paid by the Association.

From the ginnery the cotton was taken in native canoes to Amedika, and from thence in small steamers, which would not have been able to navigate the rapids between Labolabo and Amedika. The cotton had to be specially packed for the canoes, in which the cost of carriage was 20s a ton.

In 1909 the sphere of activities was transferred to the northern territories and an agricultural station was established at Ramale. Little success was, however, met with and the yield was small. In 1915 the enterprise was abandoned.

Varieties of Cotton

There are three varieties of cotton cultivated in the forest region, of which the "green seed" is the commonest. Its lint is long stapled and almost white, but it does not yield heavily. The lint of the "Volta" variety is creamy-white and the seed dark brown or black without any fuzz, except for a small brown tuft at the apex which has a sharp spike. The third kind. usually known as the "kydney" variety, has dark brown seeds adjoining one another, forming a conical mass from which it is difficult to separate the individual seeds.

These three types are similar in form to the Sea Island and Egyptian cotton. Though they have possibly come from the same original stock, they differ in habit from the American and Indian plants; they grow from seven to ten feet from the time of planting, and the stem near the base is often thicker than a man's wrist, and they appear to do best in sandy loam containing much humus. The bolls ripen continuously from January to April, and as many as 200 bolls are often produced in one season, but if left for a second season the bolls are much smaller in size.

The varieties of American cotton tried at Labolabo did not flourish; though they generally produced a good crop in the first year, they were more liable to the attacks of insects, and did not, as a rule, germinate the second year. They were more difficult to cultivate than the local varieties, and therefore not so suitable for native cultivation. Attempts to establish a cross between American and local cotton were not successful.

There is no gin in use for native work, and the lint is pulled off the seed by hand.

The Krepi sow the seed in rows on the tops of ridges, which sometimes have maize growing at the sides. On the northern limits of Ashanti, however, the cotton is usually grown alone. No system of rotation has been observed, although cotton is probably planted immediately after the yam crops in the early years of cultivation.

The "seed bugs," three species of which are found, do great damage to the cotton. As soon as the bolls are open they infest the lint and feed on the juices they suck from the seed. The cotton is placed in the sun as soon as it is picked, in order to drive the seed bugs out, as the seed is often rendered unfertile by them. The "cotton stainer" is also found, it punctures the unopened bolls and damages the lint by a yellowish stain.

(b) Sierra Leone

The Colony and Protectorate of Sierra Leone are bounded on the east by Liberia, and on the north and west by French Guinea.

The population of the Colony is about 77,000, and that of the Protectorate is estimated at a million. The area of the whole country covers about 34,000 square miles.

The Colony owes it birth to philanthropists, who sought to alleviate the lot of negro slaves, and a large number were sent to Sierra Leone in 1772, and in 1787 this number was enlarged by discharged negroes who fought in the American War of Independence.

The mortality was very great, and the population did not increase perceptibly until after 1807, when slave trading became illegal, and slaves captured by British vessels in neighbouring seas were brought to Freetown.

The most important Protectorate tribes are the Mendis, Timanis, Limbas, Sherbros, Port Lokkos, Sosoos, Galinas, Konnos and Vais.

At one time great hopes were entertained of the development of the native cotton industry of Sierra Leone, but the difficulties encountered by the British Cotton Growing Association in their attempts to establish cotton growing for export on a large scale were found to be insurmountable. The heavy rainfall (150-180 inches per annum), local inefficient method of cultivation, and disinclination on the part of the natives to adopt better ones, all contributed to the non-success of this venture.

A ginnery had been erected at Moyamba, but not enough cotton was produced to keep it employed. A large plantation was then made near it, and native, as well as exotic plants put in ; at one time the crop looked most promising, but with the advent of the heavy rains the whole crop was ruined, labour was expensive and finally the work had to be abandoned.

The native method of cultivation is to mix the seeds with those of other crops and scatter them broadcast on the field, which has previously been lightly tilled.

The cotton yields crops for two seasons, but the second one is generally very inferior. There are three varieties of native cotton known respectively as "Quondi," "Fandiwah," and "Dooli." The best results were obtained from the variety which furnishes cotton of a pale cream colour about an inch long. A ginning station was erected, but owing to a recurrence of unfavourable conditions the exports were very small, especially as most of the cotton was used to supply native looms.

(c) Gambia

Gambia is the most northerly of the British West African possessions. It consist of a narrow tract of land which follows the course of the Gambia river for a distance of 250 miles. The territory extends for about 3,619 square miles, the population of the colony comprises 13,456 inhabitants, that of the Protectorate is approximately 76,948.

The Gambia is inhabited by the Mandingo, Foulah Joloff, and Jolah tribes. The country is, on the whole, sparsely populated, and the people are careful cultivators of their land.

Cotton is grown chiefly by the Mandingoes and the Jolahs, to make the yarn for their native looms. The strips of cloth they weave are called "pagns," and are sewn together and made up into gowns.

The Mandingo cotton compares favourably with "middling American," although it is not so white or silky as the latter. It is grown as a mixed crop and produces cotton for two seasons.

The Jolah cotton is short-stapled and woolly, and although it is whiter than the Mandingo variety, it would be much more difficult to bring it up to the European standard.

The failure of the British Cotton Growing Associations' attempt to develop this industry in Gambia, can be attributed to the same causes as the failure in Sierra Leona. The natives, who were not familiar with modern methods of cultivation, found that they could get a better price for their cotton by selling it locally, than by disposing of it to the Association. Labour was scarce, and the natives preferred their old industry of ground nuts.

In 1890 an attempt was made to grow Egyptian seed in Gambia, but an experiment was a failure.

Section IV

THE LATE GERMAN COLONIES

(a) Togoland

(*i.*) ***Geographical and General***
(*ii.*) ***Historical***
(*iii.*) ***Varieties***
(*iv.*) ***Statistics***

(i.) Geographical and General

THE former German Colony of Togoland is situated on the Northern coast of the Gulf of Guinea. Its frontage on the Gulf extends for 32 miles only, but it stretches inland for nearly 350 miles and has an average width of 130 miles. It is bordered on the West by the British Gold Coast, on the North by the French colony of Upper Senegal and Niger, and on the East by the French colony of Dahomey.

Togoland is divided into two triangles by a range of mountains which begins and ends beyond the frontiers, thus forming two distinct areas—the North-western consisting of lowlands drained by the rivers Oti and Kulukpene, and the South-eastern, low-lying coastal regions, and an interior plateau.

With the exception of the Kara and Kerang rivers, which rise on the Eastern side of the chain, all the rivers of the colony, the Volta and its many tributaries, rise in the Central Range.

Transport and intercourse are made difficult by impassable hills and swollen or deep-cut rivers.

The geological formations in the East of the colony consist of gneiss and granite, whilst further West are gneiss and limestone, with considerable quantities of quartzite on the Western border.

The soil of Togoland is not very fertile. The best is found in the river valleys and at the foot of certain mountains, especially the Agu Mountain, South of Misahöhe.

In Central Togo the maximum rainfall is in September. This is followed by three months of intense heat. The water supply is dependent on the rains, perpetual drought making some parts of the colony uninhabitable.

Lome is the natural port of Togoland, and before the war there was direct communication with Hamburg.

The native population consists mainly of Sudan negroes, who have the reputation of being almost the best labour obtainable in Africa. The native population is estimated at about 1,000,000.

In 1913 there were 368 whites in Togoland, of which the large majority were Germans.

(ii.) Historical

THE German flag was hoisted at Lome in 1884 by Dr. Gustav Nachtigall, the German Consul-General for West Africa. A series of disciplinary expeditions between that date and 1890 firmly established German dominion over that small, but hitherto independent, strip of country.

Since then the Germans have spared neither trouble nor money in developing the colony to the utmost. An excellent postal and telephone service was installed, railways and roads were built, schools and colleges were started. A large wireless had just been completed at Kamina when the war broke out.

Shortly before the beginning of the 20th century, the Germans, realising the disproportion of the world's cotton supply to the needs of the world, and resentful of their entire dependence for that commodity on the U.S., determined to endeavour to start a supply within their Empire.

Togoland appeared to them to offer very special opportunities for the cultivation of cotton, as it was densely populated and the natives were excellent agriculturists, well accustomed to growing cotton for their own use.

In 1900 the German Colonial Economic Committee determined to send out an expedition to Togoland to report on the most favourable districts for cotton growing, and to find out what machinery, &c., would be needed, and to make all the necessary recommendations. The services of an American expert, Mr. James N. Galloway, were secured, and he undertook to remain some years in the country to superintend the beginning of the industry.

As the fields and lands in Togo belong to the natives, it was decided from the beginning that cotton growing should be established as a native industry, and four coloured men, all of them experienced and educated cotton growers, were sent out from Alabama in 1900 to show the natives how to work.

The first station was opened in Towe, where 100 acres were cleared. Cotton growing was afterwards taken up by the Imperial stations at Misahöhe. Ho, Kpandu, Kete Kratchi, Atakpame and Soko.

In 1904 the Colonial Economic Committee transferred its experimental station and school from Towe to Nuatjä, in Southern Togo, under the management of an American called John Robinson. The course was a three years' one, and when it was finished, the students, who were selected from different districts, returned to their native districts, where they were granted 20 acres of land each. This grant was subsequently discontinued, as it was found that the land was not used to its best advantage. In 1908 the Togo Government purchased the Nuatjä College from the Colonial Economic Committee, and since then all kinds of agricultural work, besides cotton growing, have been taught there.

The Germans hoped that under Government protection the cotton industry would be developed into a national pursuit. Not only would the natives become economically dependent on the Fatherland, but Germany even entertained the hope of eventually becoming independent of the United States for her supply of cotton. That these hopes were a great deal too optimistic, the Germans themselves finally realised, and in 1914 Moritz Schanz, on behalf of the Colonial Economic Committee, announced that cotton growing in Togoland was not capable of much further expansion.

(iii.) Varieties

NEARLY every locality in Togoland produces a different kind of cotton. The following are the most important indigenous varieties.

Two varieties of Gossypium Punctatum :—

(1) A variety with hairy seed, which is tall growing and has but a small yield, the bolls of which mature quickly. It flourishes along the coast and is able to withstand droughts.

(2) An up-country variety.

The Sokode cotton, belonging to G. Punctatum: similar to American Upland.

The Togo Sea Island cotton (G. Religiosum): a variety with bare seeds. Successful results from it have been obtained in the Upland districts, round Agu, Misahöhe and Atakpame.

The Kpandu cotton: a Hybrid of G. Peruvianum and G. Barbadense, with bare seeds which close up in a ball.

An indigenious variety which grows in the Mangu districts.

The Germans have made many attempts by hybridising the different varieties. One of their most successful experiments was made in Southern and Central Togo, where the Coast variety (G. Punctatum) crossed slightly with American Upland (G. Hirsutum) and Togo Sea Island, gave satisfactory results.

The American variety, Russel Big Bolls (G. Hirsutum) was imported from the States. It yields more than the indigenous cotton, though the production is inferior to that in the States.

Egyptian seed has also been tried, but without success.

The authorities finally came to the conclusion that the most suitable kinds of cotton for cultivation were: south of Togoland, indigenous Sea Island cotton; in Central Togo, American Upland; in Northern Togo, an East India variety.

(iv.) Statistics

EXPORTS OF COTTON FROM TOGOLAND 1902-1911.

Year.	*Cotton Bales. (550 lbs.)*	*Year.*	*Cotton Bales (550 lbs.)*
1902	80	1906-7	1,205
1903	128	1907-8	1,691
1904-5	519	1908-9	2,300
1905-6	857	1910	1,859
		1911	2,071

In order to convince the natives that it was to their interest to grow cotton, the Colonial Economic Committee guaranteed them a fixed purchase price. In 1910 they received 3¾ per pound of lint brought to the coast. Cotton was also bought at all the Central buying agencies.

The average price obtained for Togo cotton in Germany in 1911-1912 was 6d. ½ kg. (1 lb. 1 oz.), whilst cotton seed yielded £6 to £6 10s. per metric ton.

The sea freight was 12s. per bale of 550 lbs. from Togo to Bremen.

(b) Cameroons

THE Cameroons form the north-western corner of the great Central African plateau. They have an area estimated at 306,000 square miles with a coast line of 220 miles and a population of 3,611,000. They are bordered on the north-west by Nigeria, on the north-east, east and south by French Equatorial Africa and Belgian Congo (in part), and on the west by the Bight of Biafra.

The country is naturally divided into the Cameroon plateau in the north, the coastal region, divided into two by the 13,000 feet high Cameroon Mountain, the Sanga lowlands between Wesso and the river Congo, the hill country of Adamawa and the Lake Chad basin.

The chief indentations are the Rio Muni and Monda Bay in the south, and the best natural harbour of the West African coast is in the five-mouthed Cameroons estuary.

The temperature is highest in the north and lowest in the south. The rainfall varies greatly; it is heaviest on the coast, the western side of the Cameroons is one of the rainiest regions of the world, between 400 and 430 inches of rain falling during the year.

The south of the colony is covered with tropical evergreen forest, in the north are savanna regions.

Wild cotton and rice grow in the Chad basin, but the proportion of plantation products is small.

The bulk of the population consists of Sudan and Bantu negroes. Cameroon is certainly not a white man's colony and its development must depend on the capacity of the native population.

This colony was annexed by Germany in 1884. Sir Harry Johnston arrived as British Consul in the country on the same mission five days after it had been accomplished by Dr. Gustav Nachtigall. Most of the natives who were most anxious to belong to Great Britain, resented German domination, and it was only after a considerable amount of bloodshed that German influence was finally recognised over the whole country in 1902.

The Germans discovered that a large part of the country, consisting of primeval forest, a zone of oil palms and the rain-swept coast district was hopeless for cotton growing purposes, but they found that the highland districts of the interior seemed to be well adapted for its cultivation. Native cotton growing has long existed at Bamun and Balilande in Adamawa, and as far as Lake Chad.

The German Colonial Economic Committee proposed furthering cotton growing by provision of seed, ploughs, cotton gins and premium on Government stations, but until more railways had been built they did not think it worth creating a Cotton Growing Association similar to that in Togo.

The Kolonial Wirtschaftliche Gesellschaft began work in 1905 at Garua, which can be approached by the River Benue. The Imperial residence at Garua distributed cotton among the Mohammedan tribes as well as the heathen ones, and offered a reward of 2s. for 44 pounds of seed cotton.

The first cotton growing trials were undertaken at Bamun and Balilande to discover the best planting season. This was found to be between May and June. Native Bamun seed was used and experiments were also made with American and Togo seed. Trials were likewise made at the station of Yoko in Central Cameroon with Togo and Californian seed, the Togo seed giving the best results. Another trial station was erected at Geb and Kuti in 1912, and an agricultural station was established at Pittoa, near Garua.

Cotton is cultivated on a large scale by the natives south of Lake Chad, and in the alluvial district of the Benue Valley. The soil and climatic conditions are very favourable, and the district is inhabited by a dense population of intelligent natives, who work at a low price. When means of communication are established, by the extension of the Baro-Kano Railway, there are great tracts of land, similar to those of Nigeria waiting to be cultivated.

A continuation of the Duala-Monenguba Railway would open up wide districts of the highlands, which are equally suitable for cotton growing.

A valuation in Germany of native cotton grown in North Cameroon, at Alkassim, shows it to be equal to fully middling Texas.

Section V

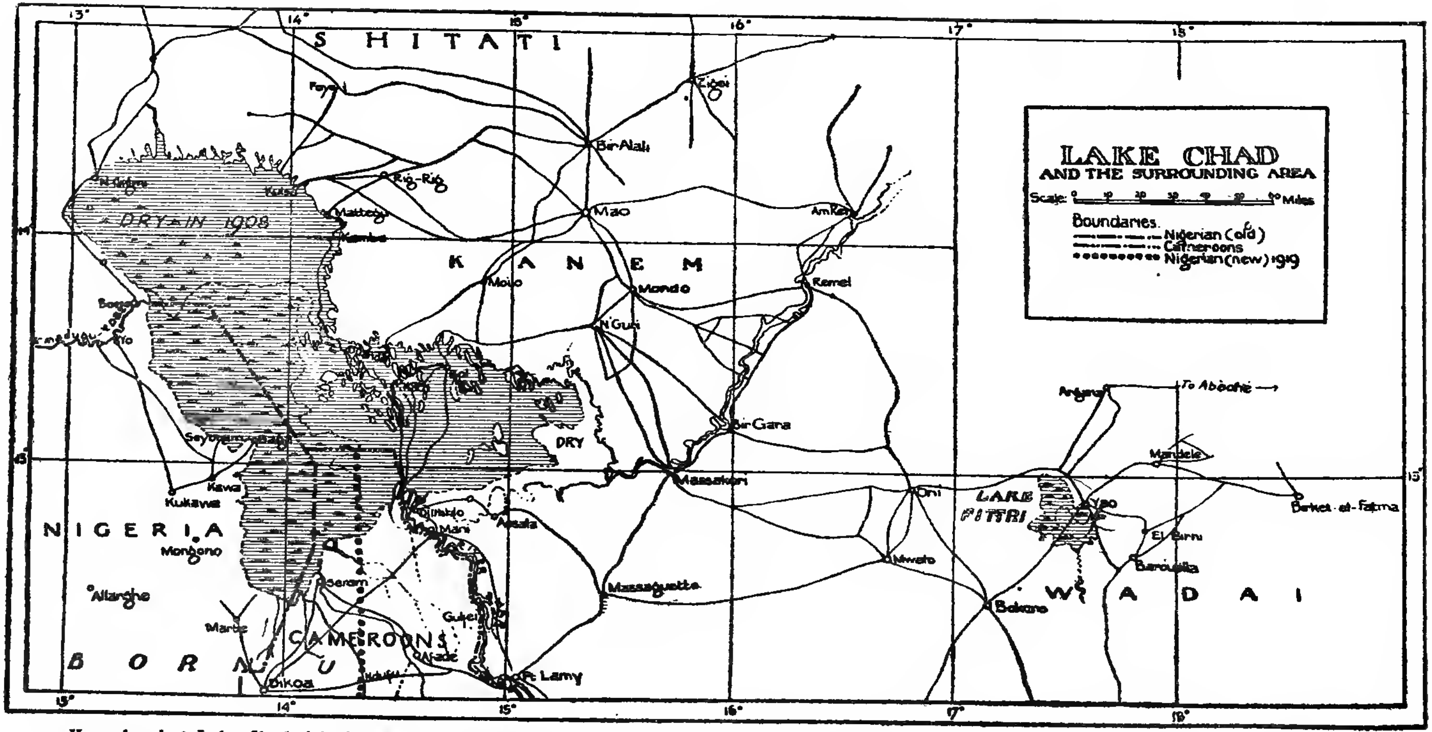
THE LAKE CHAD DISTRICT

SO very little is known of the geography of the Lake Chad area, and still less of the possibilities of successful cotton cultivation, that it is well worth giving a short general survey of the geography and history of the area, especially as a large portion of the South-eastern shores of the Lake have recently been added to the British Empire. It is unnecessary to emphasize the desirability of the British Empire being less dependent on American cotton and of growing as much as possible in her own Colonies. As has been shown in the foregoing pages, the British Cotton Growing Association has done much to attain these ends, but experts consider that there is good reason to believe that the Chad area would be the best cotton growing area in West Africa, both in regard to its soil and irrigation facilities.

Lake Chad lies approximately between 12° 50′ and 14° 10′ N., and 13° and 15° E. It forms approximately the centre of an immense depression where the soil is mostly of the same type as that found between the Blue and White Niles in the Sudan; that is to say, black cotton soil. The natives *do not* however use the patches of black cotton soil, which occur extensively in the province. for cotton planting; they plant in the other soils. This fact requires study and elucidation. The lake is divided into four different zones:—

(A) The dried up zone:
(B) The marshy zone:
(C) The navigable zone:
(D) The lagoon zone.

(A) When visited by the French Commission in 1908 the dried up zone extended North of the parallel passing by the Komadugu-Yobe. The appearance presented by this district is that of a vast plain, extending up to the limits of the horizon and with no supply of water on its surface. In places there are pools not yet completely dried up and on the islands thus formed thinly populated Buduma villages exist. To the east it is nearly impossible to detect where the lake ends and the Kanem country begins. In all this district cattle are abundant and thrive well, while big game is frequently met with.



Map showing Lake Chad (shaded portion) and neighbouring country. The Lake Chad district is a possible source of further cotton supplies.

(B) The marshy zone covers about one-third of the lake. It consists of muddy and opaque water in which grow masses of grass and reeds, but so rapid are the hydrographic changes in this area that in 1908 it was nearly dry, when four years before it had been a vast expanse of open water from 3ft. to 6ft. deep.

(C) The navigable zone fluctuates periodically, and is situated roughly in the south-east corner of the lake, starting from British Bornu on the west shore of the lake at Seyorom Baga. Going eastward there is an expanse of open water covering an area of from 16,000 to 20,000 acres bounded all round with forests of ambach. Proceeding eastwards the forest closes, leaving only a small channel about two miles long. Once this is got through, the most navigable part of the lake appears, which is roughly just within the new French territory.

(D) The zone of Lagoons is situated all along the east and north-east shores of the lake. The Lagoon-channels are of varying depth and breath, and intersect one another in all directions, penetrating into the interior and ending in chains of ponds or in independent basins.

From a general point of view Lake Chad is the shallowest lake in the World. It covers an area of 10,000 square miles, and its shores are very ill-defined, for owing to its gentle slope even the wind is sufficient to cause a submersion or emersion of considerable tracts of soil. The waters of the lake are renewed chiefly by its affluents which are the Shari, the Komadugu-Yobe, and numerous water-courses of the late German Bornu. Besides this, about one-tenth of the water of the lake is renewed by atmospheric precipitation. The losses of the lake are due to evaporation and infiltration. The amount of loss by each is very hard to calculate, but there is no reason to suppose that the lake is likely to disappear within the present geological age.

If the provisional agreement of March 4th, 1916, with regard to the Division of the Cameroons between the French and British is definitely ratified, and nothing of importance added in the Lake Chad District, nearly half of the coast line of the lake will fall to the British—that is to say from Bosso at the extreme north-west corner of the lake nearly to the delta of the Shari.

Round the circumference of the lake is a belt of very rich soil varying from 5 to 10 miles in breadth, which is inundated annually by the lake. The annual rise occurs usually in November, the maximum flood being reached in January. It is in this latter month that the natives plant their crops, including cotton, and the lake recedes in February and March. The rainfall is very small, but the cotton ripens about September. The total area suitable for cotton growing is about 200 miles and falls within both British and French territory. Two of the richest areas are at the estuary of the Komadugu, and in the southern corner of the lake near Dikoa and Gulfei.

The conditions of Chad prevail east, and are continued in another inundated area similar to Chad called Fittri, which is a closed lake fed solely by the local rains. It is not saline, and has an average depth of about 5 feet and is estimated at being 50 feet higher than Chad. The inhabitants of this region are sedentary Baulalas, who are chiefly occupied in the cultivation of millet any cotton. The cotton of this region has been famous for mand years, and in native estimation is considered far the best in the Sudan belt. It has never been exported owing to lack of transport, but the Germans state that certain native cotton grown at Alkasim near Chad was equal to Middling Texas. If this statement is correct it would probably apply equally to all the cotton grown round Chad and Fittri, and with the railway completed from Kano to the lake, the future of the Chad area as a cotton growing centre would be assured. For many years the whole of the western shore of Chad has been a game reserve, and at the present moment the elephants are so numerous that cultivation is at a discount. It has never been scientifically studied from the agricultural point of view, but all kind of crops grow there, including wheat and barley in profusion.

From the labour point of view the conditions of the Chad area are similar to those of the Chausa and Tornba country, for the natives being by nature semi-nomadic are readily attracted by an industry which shows a chance of gain. The great economic difficulty of the country is to keep the people in it; there are so many better opportunities for profit outside the Chad region. At present the natives go as far afield as Kano, Southern Cameroons, Lagos and the Anglo-Egyptian Sudan, in search of work. If a permanent industry were once established in Bornu it would keep the greater proportion of this roving population at home. Cotton cultivation in this area would not have to compete with other and, perhaps, more paying industries, as is the case in other parts of Nigeria. In some respects it would even be a new industry to the natives, or at any rate an industry which would be carried on without detriment to other productions, such as ground nuts or palm oil.

It is as well to remember that the climatic conditions of Bornu are totally different to those of the west coast of Africa, or even of the Hausa Country, and more closely resemble those of Wadai and Kordofan in the Anglo-Egyptian Sudan. In the south of Bornu the average rainfall is between 20 inches and 30 inches a year, and in the northern part it rarely exceeds 16 inches a year. The temperature is at its lowest in January, and averages 75° F. around Fort Lamy, while in April it is over 91° F. A temperature of about 120° F. is often reached at midday in the hot season.

As regards the possibilities of a paying railway to Lake Chad, the southern corner of the lake is, undoubtedly, the point to make for. Quite apart from the possibilities of a large cotton export not only from Bornu, but from the friendly and allied territories to the east, the southern corner of Lake Chad is, from the broad commercial point of view, the dominating centre of the whole of the trade of North Central Africa—serving an area as far east as Darfur, as far south as the upper affluence of the Congo, and as far north as the regions of Tibesti and Borku. From the southern corner of the lake, south, east and north, towards the regions mentioned the roads are good and supplies plentiful; water also is sufficient.

The general trend of the trade is thus naturally towards the west, and not the east, not only for these reasons but ethnologically and socially. That is to say Wadai and all the countries west of it belong to the Chad area, not to the Nile area. A railway terminus at the southern corner of the lake would thus become a supplying centre for the whole of this vast region. It would also, very probably, be a welcome assistance to the French Government of the Territoire Militaire, which is so far distant from the coast that it has had, and still has the greatest difficulties in securing necessary stores, material, etc.

Historical

LAKE Chad is supposed to have been known by report as early as the time of Ptolemy (A.D. 130) but was not seen by white men till 1823, when it was reached from Tripoli by the British Expedition under Dr. Oudney, accompanied by Captain Clapperton and Major Denham, when the lake was named Waterloo. It was visited again in 1850, 1855 nad 1870. and was not investigated in any detail until the latter date. In 1890 to 1893 its shores were divided by treaty between Great Britain, France and Germany. From that date the French have taken more trouble to explore the lake and its surrounding country, than either the Germans or the British. It was not until 1900 that communication between Algeria and Chad was opened. A British force, under Colonel Morland, visited the lake at the beginning of 1902, and in May in the same year the Germans reached it from the Cameroons for the first time. Detailed surveys were made by French officers the following year, and in 1905 Lieut. Boyd Alexander further explored the lake, and finally in 1907/8 a larger expedition under Captain Tilho made lengthy studies of its hydrography, fauna and flora, and published a complete series of maps and four thick volumes of explanatory matter.

On March 4th, 1916, the provisional agreement between the French and British with regard to the eastern boundary of the Cameroons was drafted, and after the Armistice was signed the Council of Four asked France and Great Britain to draw up an agreement on the same question to be submitted afterwards for ratification to the League of Nations. This was done on June 28th, 1919, when it was agreed that the final line of demarcation between the French and British Territories would not differ sensibly from that which was fixed by the provisional agreement. An extension of the British zone was conceded by France in the region of Bornu, and in return the frontier was adjusted further south so as to leave entirely in French territory the road constructed by the German administration from the coast towards Lake Chad.

The Aborigines of the Chad Basin were, as far back as native tradition and record goes, of similar type to the Hill Pagans, who now live on the Bauchi Plateau. About 1000 A.D. these Pagans were driven West by a very tall type of negro called Kotoko, which is still surviving on the Southern shores of the Lake. These people, known as the "Sos" in the Bornu records, drove the Aborigines out of the country and spread North as far as the Komadugu and West as far as Karnu.

From about 800 A.D. Arab tribes began to sweep into Africa. They over-ran Tripoli and Fezzan, and coming South began to fuse and internarry with the Hamatic Berbui inhabitants of the Tibesti and Kanem region. From an amalgamation of Arabs, said to be of the Yemenite origin with some Tubu or Teda mother stock, sprang a race of kings commonly called the Sefawa, who began to reign over Kanem about 900 A.D. Kanem, which was in alliance with the Hafsite Dynasty of Tunis (founded in 1336) grew powerful in the four succeeding centuries, and the natives of Kanem began to raid Bornu to the West and drive the "Sos" South and West.

On the heels of the Kanem conquest of Bornu there followed a large influx of Arabs and Hamites, so that the negro of Bornu was replaced by a cattle and sheep owning population. In addition to the ownership of animals, the power of Bornu was built up of slave trading from the tribes to the South.

In about the thirteenth century the power of Bornu extended practically from the Niger to the Nile. Then followed a period of civil war. In the seventeenth century, again Bornu was much the most powerful state in the Sudan.

Like all monarchies founded on Oriental despotic ideas, the ruling classes became greatly demoralized, and in 1810 the rising Fulani powers in the West gained the upper hand, and on the Fulani retirement, a Fezzani Marabout was able to seize the reins of government and dominate the whole Chad region. From him is descended the present Shehu of British Bornu, who still rules as much of Bornu as lies within British territory under the protection of the Government of Nigeria.

Section VI

The Future of Cotton Growing in British West Africa

As regards Gambia, Sierra Leone and the Gold Coast, it seems most unlikely for reasons given elsewhere, that there will be any revival of the industry. There will, of course, always be a native industry, but this being entirely local will in no way affect the cotton production of West Africa from a British point of view. Great expectations are entertained regarding Nigeria, but these can only be realised if the three great wants of the country are properly attended to: they are as follows :—

(1) Roads
(2) Railways
(3) Agricultural Departments

(1) *Roads:* The roads of Nigeria are at present far from adequate, and although in text books a road is often described as being a good motor road, for more than half its course it is nothing more than bush track.

In the Southern provinces there are many roads in the region of Abeokuta which should be made suitable for motor traffic. At present such a road only exists between Abeokuta and Aiyetoro.

From a cotton growing point of view, motor roads suitable for waggons and heavy traffic should be made from Oshogbo to Illesha and Ife. Two further roads are necessary in this district: one from Abuja to Minna on the railway and the other from Abakaliki to some point on the Southern section of the Eastern railway, perhaps at Enugu.

In the North-west district of Nigeria there are a few good roads, but owing to the importance of this district for cotton growing, it is most essential that Sokoto should be linked up permanently with both Zaria and Kano by good roads. It has been suggested that Sokoto should be joined by a railway to either Zaria or Kano, but recent evidence of the importance of the Chad district tends to show that a railway from Kano to the Southern shores of Lake Chad would be even more profitable. More will be said of this scheme in the next sub-section.

It is not only the main roads like that suggested from Sokoto to Kano which require attention, but the construction of numerous subsidiary roads entirely for the use of the natives, which would be made from all villages within a reasonable distance of either a railway station or a main road.

(2) *Railways*: Although the necessity for roads is very great, motor transport is not always an economical method, and

it has been suggested that light railways of a similar pattern to those in use in Egypt would, in many cases, be not only more economical but more effective. Experiments with such light railways would best be made in the Southern provinces where they would act merely as "feeders" to the main roads or the trunk lines.

As regards the development of the main railway system, as was mentioned in the introduction to the section on Nigeria, one of the first railways to be completed will probably be that from Udi to Kaduna. Another line has been suggested from Udi via Yola to Maidugari, but it would seem to be of greater importance to join up Kano with Lake Chad: the line would run from Kano via Katagum to Maidugari, thence to Dikoa (now British) North-east to Ngala, which is now practically on the new boundary between Nigeria and the new French Cameroons. From Ngala it would probably be sufficient to construct a light railway right to the shores of Chad.

(3) *Agricultural Departments:* The importance of a far greater development of agricultural departments, not only in Nigeria but in practically all our Crown Colonies, cannot be over estimated. In the case of Nigeria it must be remembered that it is practically entirely an agricultural Colony, and that the revenue is entirely dependent upon the development of such industry, and that fact alone should surely make agriculture one of the first considerations in dealing with the question of Administrative Departments.

The Agricultural Department opened its first experimental seed farm at Maigana on the Zunguru-Bauchi line, and in the southern provinces a plantation for growing improved Georgia seed has been opened at Meko. So far both have been a success, but a far larger number of similar farms should be started at the earliest possible date at the most important points in the cotton district of Nigeria. There should be one at Oyo and Iseyin, in the Oyo district of the Southern Provinces; at Abuja and Zungon-Katab, south of Kaduna; in the Sokoto district in the extreme north-west; and at Maidugari or Dikoa in the Chad region. The east centre should have its own Resident Agriculturist who should experiment with different seeds, plants, etc., and try various methods of growing them, and make a special study of soils, manures, etc., suitable to the district served. There would naturally have to be a small but capable staff of scientists under the direction of a highly paid Director, which would include entomologists and mycologists. It has been suggested that the whole department should be under the direction of a first-class man, and that the *modus operandi* should be similar to that employed in the Imperial Department of Agriculture in the West Indies. The necessity of the mycologist cannot be over-estimated, for as in the case of the rubber tree, unless the causes and cures of every disease and pest are scientifically studied, there is always a serious danger of contagious disease starting, and an entire plantation destroyed.

As regards the Cameroons and Togoland, little can be said now that we know the probable division of those late German Colonies. On Saturday, June 28th, an agreement was drawn up between representatives of the British and French Governments, by which France obtains Lome (the capital of Togoland), and the Misahöhe and Atakpame railways, and Britain is ceded part of the northern district where the tribes are naturally attracted to the British Gold Coast. This means that as far as cotton is concerned the British do not score in respect of Togoland, for, as was explained in the section on that Colony, all the cotton growing centres are in the districts of Kete-Krachi, Atakpame and Misahöhe.

With regard to the Cameroons, the map at the beginning of the memorandum shows clearly by the shaded lines that the area of the Provisional Agreement of March, 1916, will probably fall permanently to the British, namely a strip of country from Yola to the coast between Buea and Duala, and a small but important piece formed roughly by the triangle Dikoa, Keroua, Kutelaha. This latter area shows promise of being one of the most important cotton areas in the whole of north-west Africa.

The new Anglo-French boundary runs through an important cotton district between 5° and 6° N. lat., starting on the coast between Buea and Duala, and runs N.N.E. near Lum, where it curves north-east to Bare, and continues in the same direction to Kutum which is about 38 miles north of Fumban. After Kutum the boundary runs slightly E.N.E. to Songolong, and then north-east near Banjo to Sambolabo, when it continues N.N.E. past Kontscha to a point on the old boundary about 34 miles south of Yola. Here the line follows the old boundary until it reaches Bama, where the new British Chad district begins. Fumban can be taken roughly as the centre of cotton growing in the Cameroons, and although this is now French territory, the cotton area runs west and south-west across the boundary to places such as Bare, Mbo, Dschang, Bagam, Bana, etc. At present the British will be dependent upon the railway which runs from Duala and is now a French possession. It is obvious therefore that the only immediate developments that can be made are to improve the roads leading from all the cotton districts, to the boundary where the railway starts.

Section VII

GENERAL STATISTICS

Table	*1.*	**Exports from U.K. to B.W. Africa**
„	*2.*	**Exports from B.W. Africa (general)**
„	*3.*	**Imports into U.K. from B.W. Africa**
„	*4.*	**Nigerian exports**
„	*5.*	**Gold Coast exports**
„	*6.*	**Sierra Leone exports**
„	*7.*	**Gambia exports**
„	*8.*	**Cotton grown in various parts of B.W. Africa**

Table 1

Exports from United Kingdom to British West Africa

	1917	1918	1919	1917	1918	1919
	Yds.	Yds.	Yds.	£	£	£
Grey Cotton ...	526,800	507,500	659,500	8,584	12,867	25,204
Bleached Cotton ...	3,346,500	4,308,600	3,135,600	57,165	123,373	124,448
Printed Cotton ...	3,916,000	4,450,900	4,299,600	87,454	150,671	214,411
Cotton dyed in the piece.	1,063,100	1,255,500	761,600	29,585	52,759	39,564
Coloured Cottons ...	1,387,700	1,495,600	2,262,900	34,712	55,064	106,351
Cotton piece goods (all kinds)	10,240,100	12,018,100	11,119,200	217,500	394,734	509,978
Total ...	20,480,200	24,036,200	22,238,400	435,000	789,468	1,019,956

Table 2

Exports of Cotton from West Africa (In bales of 400 lbs.)

	Bales	£
1908	5,864	54,490
1909	12,660	104,060
1910	6,225	78,742
1911	5,619	67,174
1912	10,983	103,436
1913	15,972	159,911
1914	14,183	151,379
1915	6,773	56,652
1916	18,680	244,396

Table 3

Imports of Cotton into the United Kingdom from British West Africa. (In bales of 400 lbs.)

1909	12,463
1910	6,440
1911	5,277
1912	10,796
1913	15,404
1914	13,868
1915	5,728
1916	16,002
1917	12,569
1918	2,742

Table 4

Exports of Cotton from Nigeria. (In bales of 400 lbs.)

Southern Nigeria. (Including cotton passing through the country from Northern Nigeria)	
1902	30
1903	702 (approx.)
1904	2,871
1905	3,437
1906	6,740
1907	10,224

Northern Nigeria	
1908	142
1909	350
1910	146
1911	231
1912	648

(No separate returns available later than 1912).

Northern and Southern Nigeria

	Bales	£
1908	5,736	53,317
1909	12,582	103,270
1910	6,196	78,479
1911	5,595	66,935
1912	10,932	102,931
1913	15,903	159,223
1914	14,124	150,791
1915	6,743	56,352
1916	18,635	243,949

Table 5

Exports of Cotton from the Gold Coast (In bales of 400 lbs.)

	Bales	£
1903	26	—
1904	144	—
1905	73	—
1906	232	—
1907	140	—
1908	128	1,171
1909	78	790
1910	29	263
1911	24	238
1912	51	505
1913	69	688
1914	59	588
1915	30	300
1916	45	447

Table 6

Exports of Cotton from Sierra Leone. (In lbs.)

1903	1,120
1904	28.267
1905	68,808
1906	87,805
1907	13,006
1908	336
1909-1915	nil

Table 7

Exports of Cotton from Gambia. (In lbs.)

1901	48
1902	120
1903	1,560
1904	59,828
1905	2,572
1906	129
1907-1913	nil
1914	126
1915	nil

Table 8

Approximate Estimate of Cotton Grown in New Fields in British West Africa. (In bales of 400 lbs.)

	Gold Coast	Lagos	S. Nigeria	N. Nigeria	Total
1906	200	6,000	150	1,000	7,350
1907	250	9,500	250	1,500	11,500
1908	200	5,500	200	500	6,400
1909	200	12,100	300	400	13,000
1910	100	5,900	300	400	6,700
1911	100	5,800	300	600	6,800
1912	120	8,900	270	2,600	11,890
1913	100	14,000	200	2,000	16,300
1914	100	13,600	150	1,000	14,850
1915	100	6,200	100	1,200	7,600
1916	100	9,300	100	10,800	20,300
1917	100	7,800	100	3,900	11,900
1918	100	3,000	100	3,000	6,200

Section VIII

COTTON BIBLIOGRAPHY

From : 1881

To : 1920

ARRANGED CHRONOLOGICALLY

1881 Butterworth, J. *Cotton and its Treatment. Oldham.*
1881 Shepperson, A. B. *Cotton Facts.*
1882 Jannasch, R. *Die Europaische Baumwollen Industrie, Berlin.*
1882 Cross, R. *The Cotton Yarn Spinner. Philadelphia.*
1882 *The Cotton Spinners' Directory. Oldham.*
1883 Dupont and V. Schlumberger. *Aide mémoire pratique de tissage de coton. Paris.*
1885 Ephem. *Woods' Cotton Spinners' Diary. Manchester.*
1885 Prestwich, A. *Pocket Guide to Cotton Spinning. Bury.*
1885 Branner, J. C. *Cotton in the Empire of Brazil. Supt. of Doc., U.S.*
1885 *Overlookers' Guide to Calico Weaving. Bury.*
1885 Robinson. *Cotton Yarn Calculator. Nelson.*
1885 Saladin, E. *La Filature du Coton. Rouen.*
1885 Deschamps, L. *Etudes sur le Coton. Rouen.*
1886 *Cause of the Present Depression in the Cotton Trade. Manchester.*
1886 Ellison, T. *Cotton Trade of Great Britain. London.*
1886 Witham, W. W. *Practical Cotton Spinners. Manchester.*
1887 Slagg, J. *Cotton Trade and Industry.*
1887 Andrews, S. *Fifty Years' Cotton Trade. Oldham.*
1887 Lee, H. *Vegetable Lamb of Tartary. Fable of the Cotton Plant. London.*
1888 Cunliffe, R. *Helps to Technical Examination in the Cotton Manufacture. Manchester.*
1888 *Bombay and Lancashire Cotton Spinning Enquiry. Manchester Chamber of Commerce.*
1888 Leigh, W. *Practical Cotton Spinning. Skipton.*
1889 Brooks, C. P. *Handbook for Cotton Manufacture Students. Manchester.*

1889 De Silva, W. A. *Cotton Cultivation. Colombo.*

1889 Sansone, A. *L'impression des tissus de Coton. Manchester.*

1890 Holme, J. E. *Handbook to Cotton Spinning. Manchester.*

1890 Monie, H. *The Cotton Fibre. Manchester.*

1890 Nuebling, E. *Ulms Baumwollweberei im Mittelalter. Staats and socialwissenschaftliche Forschungen.*

1890 Hallett, H. S. *Development of our Eastern Markets for British Cotton Manufactures. Manchester.*

1892 *The Crisis in the Cotton Trade. Liverpool.*

1892 Brooks, C. P. *Cotton Manufacturing. Blackburn.*

1892 Cunliffe, R. *Cotton Students' Manual. Manchester.*

1893 Taylor, J. T. *Cotton Weaving and Designing. London.*

1893 Walmsley, H. E. *Cotton Weaving and Spinning. Manchester.*

1893 Mell, P. H. *Report on the Climatology of the Cotton Plant. U.S. Supt. of Doc.*

1894 Mortimer, J. *Cotton from Field to Factory. Manchester.*

1894 Dobson, B. A. *Humidity in Cotton Spinning. Bolton.*

1894 Lister, J. *Cotton Manufacture. London.*

1895 Marsden, R. *Cotton Weaving.*

1895 Binns, H. *Cotton and the Cosmos. Manchester.*

1895 Schultze-Gaevernitz, G.v. *The Cotton Trade in England and the Continent. London.*

1895 Blanc, E. *La Culture du Coton en Asie et en Algerie. Société d'Agriculture. Paris.*

1895 Mortimer, J. *Cotton Spinning.*

1896 Holmes, J. *Calculations in Cotton Weaving. Burnley,*

1896 True, A. C. *The Cotton Plant: Its History, Botany and Uses. No. 33 Experiment Stations Bulletin. U.S.A.*

1896 Binns, H. *The American Cotton Crop of 1896. Manchester.*

1896 Bonami. *The Doom of the Cotton Trade and the Fall of the Factory System. Manchester.*

1896 Dabney, C. W. *The Cotton Plant. U.S.A. Supt. of Doc.*

1896 Taggart, W. S. *Cotton Spinning. London.*

1897 American Economic Association. *The Cotton Industry.*

1897 Halle, E. L. v. *Baumwollproduktion in den nordamerikanischen Sudstaaten. Staats und socialwissentschaftliche Forschungen.*

1897 Morris. J. *The Elements of Cotton Spinning. London.*

1897 Comstock, J. H. *Cotton Insects. U.S.A. Supt. of Doc.*

1897 Thurston, E. *Monograph of the Cotton Fabric Industry of Madras. Madras.*

1897 Foaden, G. P. *Cotton Cultivation in Egypt. U.S.A. Supt. of Doc.*

1898 Silberrad, C. A. *Monograph on Cotton Fabrics Produced in the North-Western Provinces. Allahabad.*

1898 Brooks, C. V. *Cotton: Its Uses, Varieties and Preparation.*

1898 Galloway, J. R. *Shipping Rings and the Manchester Cotton Trade. Manchester.*

1899 *Cost of Cotton Production. U.S.A. Supt. of Doc.*

1899 Smith, E. F. *Wilt Disease of Cotton, Water Melon and Cowpea. U.S.A. Supt. of Doc.*

1899 Koems, A. *Die sächsische Baumwollenindustrie am Ende des vorigen Yahrhunderts. Leipzigen Studien aus den Gebiet der Geschichte. Die Störungen in Deutschen Wirtschaftsleben während der Jahre, 1900.*

1900 Lecomte, H. *Le Coton. Paris.*

1900 Monie, H. *The Cotton Handbook Series No. 1, Bombay.*

1900 Dewey, L. H. *Egyptian Cotton in the U.S. Supt. of Doc.*

1900 *Wilt Disease of Cotton and its Control. U.S.A. Supt. of Doc.*

1900 Morrill, A. W. *Plant Bugs Injurious to Cotton Bolls. U.S.A. Supt. of Doc.*

1900-4 Watkins, Y. L. *Commercial Cotton Crops. U S.A. Supt. of Doc.*

1901 Tompkins, D. A. *Cotton and Cotton Oil.*

1901 Dobson, Sir B. A. *Humidity in Cotton Spinning. Manchester.*

1901 *Lectures on Cotton Spinning. Managers' and Overlookers' Society. Bolton.*

1901 Holme, J. E. *Handbook to Cotton Spinning, Manchester.*

1901 Sansone, A. *Printing of Cotton Fabrics. Manchester.*

1901 Tailfer, L. *Practical Treatise on the Bleaching of Linen and Cotton Yarns and Fabrics. London.*

1901 Tombesi, U. *L'Industria cotoniera Italiana alla fin del secolo XIX. Pesaro.*

1901-2 *Cotton Spinning.* 3 vols. *London.*

1902 Young, T.M. *The American Cotton Industry. London.*

1902 Bean, P. *Chemistry and Practise of Sizing. A Manual for cotton manufacturers. Manchester.*

1902 British Cotton Growing Association. *Correspondence, etc. Oldham.*

1902 Oppel, A. *Die Baumwolle nach Geschichte. Anbau, Verarbeitung und Handel. Leipzic.*

1903 Vossion, L. *L'industrie cotonniére dans l'Inde au 31 Mars, 1903. Paris.*

1903 Sybel, H. *Die Baumwollindustrie.*

1903 Pennefather, D.F. *Relative Progress of the Cotton Industries of the World.*

1903 Houdoy, J. *La Filature du Coton dans le nord de France. Paris.*

1903 Posselt, E. A. *Cotton Manufacturing. London.*

1903 Webber, J. *Growing of long-stapled Upland Cotton. U.S. Agric. Supt. of doc.*

1904 Nasmith, J. *The Students' Cotton Spinning Guide. Manchester.*

1904 Shepperson, A.B. *Cotton Facts. N.Y.*

1904 *Souvenir du premier semestre de la saison cotonnière de 1903-4.*

1904 Shelly Correa, C. *Manual practico para el cultivo de Agodonero en algunas regiones de España, Baleares Canares, Fernando Po. Madrid.*

1904 Henry, Y. *Le Coton dans l'Afrique Occidentale Française. Paris.*

1904 Lamborn, L. L. *Cotton seed products: a manual of the treatment of cotton seed. N.Y.*

1904 Monie, H. *The Cotton Fibre and the mixing of Cotton Manchester.*

1904 *Cotton in the old days. The past connection of the West Indies with cotton planting in N. America. Georgetown.*

1904 Chapman, S. J. *The Lancashire Cotton Industry, Victoria University. Economic Series, No. 1. Manchester*

1904 Davies, N. D. *Cotton Planting in British Guiana in olden times. Argosy Co., Georgetown.*

1904 Cook, O. F. *Cotton Cultivation in Guatemala. U.S. Agric.*

1905 Bean P. and MacCleary, W. *The Chemistry and Practice of Finishing. Manchester.*

1905 *The Cotton Industry and Trade. London.*

1905 Lecomte, H. *Le Coton en Egypte. Paris.*

1905 Rodriquez Navas, M. *El Agodon. Su Cultiva producción y commercio. Madrid.*

1905 Dale, S. S. *The Second International Congress at Manchester.*

1905 Pupin, R. *Le Coton. Sa production. consommation. etc. Paris.*

1905 Davies, N. D. *Cotton Planting in the British West Indies Georgetown.*

1905 Eggers, T. J. *American Cotton Crops of the past, present and future. Liverpool.*

1905 Titus, E. S. *Cotton red spider. U.S. Agric. Supt. of doc.*

1906 Burkett, C. W. *Cotton. a practical manual. Farm Library.*

1906 Flatters, A. *The Cotton Plant. its development and structure. Sherratt & Hughes.*

1906 Labière, A. *Le Coton, Culture, Preparation, Commerce.*

1906 *Le Coton dans l' Afrique Occidentale Française.*

1906 Bottomley, J. *Cotton growing in Australia.*

1906 Gorst, H. C. *Cotton. American visible supply and weekly changes.*

1906 Redding, R. J. *Essential steps in securing an early crop of cotton. U.S. Agric. Supt. of doc.*

1906 Thompson, H. *From the cotton field to the cotton mill. Macmillan.*

1906 Sanderson, E. D. *Miscellaneous Cotton Insects in Texas. Supt. of doc.*

1906 Cook, O. F. *Weevil resisting adaptations of the cotton plant. U.S. Supt. of doc.*

1906 Hammerschmidt, W. *Geschichte der Baumwollindustrie in Russland. Abhandlungen aus dem Staatswissenschaftlichen Seminar zu Strassburg Hft 21.*

1907 Henry, J. *Campagne Cotonnière de 1906. (Afrique Occidentale Française).*

1907 Orton, W. A. *Sea Island Cotton. U.S. Agric. Supt. of doc.*

1907 Whittam, W. *Report of England's Cotton Industry. U.S. Manuf. Supt. of doc.*

1907 Watt, Sir G. *Wild and cultivated cotton plants of the world. Longmans.*

1907 *Cotton Finishing. Heywood & Co.*

1907 Bennett, F. P. *Cotton Fabric Glossary.*

1907 Allard, H. A. *Fibres of long stapled American cotton. U.S. Supt. of doc.*

1907 Clark, W. A. G. *Cotton Fabrics in British India and the Philippines. U.S. Manuf. Supt. of doc.*

1907 Blair, M. *The Paisley thread industry and the men who created it. A. Gardner.*

1907 *Cotton Fabrics in Middle Europe, Germany, Austria, Hungary, Switzerland. U.S. Supt. of doc.*

1907 *Improvement of cotton by seed selection. U.S. Supt of doc.*

1908 Clark, W. A. G. *Cotton Fabrics in Middle Europe. U.S.A. Bureau of Manuf. Special Agent Series. No. 24.*

1908 Charles-Roux, F. *La Production du Coton en Egypte.*

1908 *Cotton in the U.S,*

1908 Heylin, H. B. *The Cotton Weavers' Handbook. Griffin & Co.*

1908 Kearney, T. H. and Petersen, W. A. *Egyptian Cotton in South Western U.S. Supt. of doc.*

1908 Clark, W. A. G. *Cotton Textiles in the Turkish Empire. Greece and Italy. U.S.A. Bureau of Manufacturers. Special Agent Series No. 18.*

1908 Watkins J. L. *King Cotton; a review 1790 to 1908. Watkins & Sons. N.Y.*

1908 Tyler, E. J. *Nectaries of Cotton. U.S. Supt. of doc.*

1908 Orton, W. A. *Cotton Twill. U.S. Agric. Supt. of doc.*

1908 Bennett, R. L. *Methods of breeding early cotton to escape boll weevil damage. U.S. Agric. Supt. of doc.*

1908 Cook, O. F. *Re-appearance of a primitive character in cotton hybrids. U.S. Agric. Supt. of doc.*

1908 Bowman, F. H. *Structure of the cotton fibre. Macmillan.*

1908 Dilthey, F.O. *Die niederrheinische Baumwollindustrie. Jena.*

1909 Bruckert, A. *Cotton Pamphlet relating to the Liverpool Cotton Market. Liverpool.*

1909 *The Cotton Year Book and Diary. Manchester. Annual.*

1909 Haslam, J. *Cotton and competition. England Independent Labour Party. Pamphlets.*

1909 Hewins, W. A. S. *Tariff Reform in relation to cotton. Tariff Reform League.*

1909 Taylor, J. T. *Cotton weaving and designing. Longmans.*

1909 Cook, O. F. *Study of diversity in Egyptian cotton. U.S. Supt. of doc.*

1909 Cook, O. F. *Suppressed and intensified character in cotton hybrids. U.S. Supt. of doc.*

1909 Cook, O. F. *Origin of the Hindi cotton. U. S. Sec. to Agric. Supt. of Doc.*

1909 Howard, L. O. *Insects affecting cotton plant. U.S. Agric. Supt. of doc.*

1910 *Master Cotton Spinners' Association Year Book. Oldham.*

1910 Besso, S. L. *The cotton industry in Switzerland, Voralberg and Italy. Manchester University Publications. Economic Series. No. 13.*

1910 Bean, P. and Scarisbrick, F. *Chemistry and practice of sizing. Kirkham and Pratt. Manchester.*

1910 *Cotton growing in German Colonies Taylor and Garnett. Manchester.*

1910 Schanz, M. *Baumwollbau in Deutschen Kolonien. Koloniale Abhandlungen. Hft 30.*

1910 *Facts about the cotton industry. Ashton-under-Lyne.*

1910 Knapp, S.A. *Cotton, the greatest of cash crops. Sec. of Agric. U.S. Supt. of doc.*

1910 Tyler, F. J. *Varieties of American upland cotton. U.S. Supt. of doc.*

1909-11 Clarke, W. A. G. *Cotton goods in Latin America. U.S.A. Bureau of Manuf. Special Agent Series. Nos. 31, 36, 40 and 44.*

1911 Groelbich, E. *Die Baumwollweberei der Sächsischen Oberlausitz. Staats and socialwissentschaftlichen Forschungen. H ft. 159.*

1911 Curtis, A. T. *Story of Cotton. Penn, U.S.*

1911 Cook, O. F. *Hindi cotton in Egypt. U.S. Supt. of doc.*

1911 Nishi, H. *Die Baumwollspinnerei in Japan. Zeitschrift für die gesammte Staatswissenschaft. Erganzungsheft 40.*

1911 Hause, J. M. *English cotton goods trade. U.S.A. Bureau of Manuf. Special Agent Series, No. 47.*

1911 Brooks, E. C. *Story of cotton and the development of the Cotton States. U.S. Rand.*

1911 Edge, J. H. *Notes on practical cotton finishing. Trades Papers Publishing Co.*

1912 Levy, R. *Histoirè èconomique de l'industrie contonière en Alsace.*

1912 Ferrar, H. T. and Hurst, H. E. *The effect of water on the cultivation of cotton. Egyptian Ministry of Finance Survey. Dpt. Papers. No. 24.*

1912 *Cottonworm and Bollworm Commission. Egypt. Circular No. 1. Cairo.*

1912 Balls, W. L. *Cotton Plant in Egypt. Macmillan's Science Monographs.*

1912 Cook, O. F. *Cotton improvement under weevil conditions. U.S. Agric. Supt. of doc.*

1912 Copeland, M. T. *Cotton manufacturing industry of the U.S. Harvard University.*

1912 Hause, J. M. *English methods of dyeing, finishing and marketing cotton goods. U.S. Supt. of doc.*

1912 Landauer, E. *Handel und Produktion in der Baumwollindustrie unter besonderer Berücksichtigung der lohnindustriellen Organisationsform Archiv für Socialwissenschaft. Erganzungsheft 7.*

1912 Herzog *Determination of cotton and linen by chemical and microscopic methods. Teachers' College.*

1912 Hunter, W. D. *Cotton Stainer (dysdercus suturellus). U.S. Supt. of doc.*

1912 Lewton, F. L. *Rubelzul Cotton. Smithsonian Inst.*

1912 MacGregor, E. H. *Red Spider on Cotton. U.S. Supt. of doc.*

1912 Lewton, F. L. *Cotton of the Hopi Indians. Smithsonian Inst.*

1913 Haylin, H. B. *Buyers and Sellers in the Cotton Trade. Griffin & Co.*

1913 Schanz, M. *Cotton in Egypt and the Anglo-Egyptian Sudan.*

1913 Macara, Sir C. W. "*Leading the World*" *Lancashire's cotton industry. Times Publishing Co.*

1913 Lackman, C. *Die Unfallverhütung in der Baumwollspinnerei, Volkwirtschaftliche Abhandlungen der badischen Hochschulen. N.F. Hft. 23.*

1913 *Preliminary Report on the field experience upon cotton carried out at Talbia. Giza.*

1913 Cook, O. F. *Heredity and cotton breeding. U.S. Supt. of doc.*

1913 Dehn, R. M. R. *German cotton industry. Longmans.*

1913 Lomax, F. W. *Fine cotton spinning. Textile Manufacturers Manuals.*

1913 Taggart, W. S. *Cotton Spinning Vol. 1. Macmillan.*

1913 Lewis, W. S. *Physical testing of cotton yars. U.S. Stand. Supt. of doc.*

1913 Mercier, W.R. and Savely, H. E. *Knapp method of growing cotton. Doubleday.*

1913 Corlett, D. S. *Cotton in Egypt. Colombo.*

1913 Kearney, T. H. *Seed Selection of Egyptian Cotton. U.S. Agric. Supt. of doc.*

1913 Gilbert, W. W. *Cotton anthracnose and how to control it U.S. Agric. Supt. of doc.*

1913 Hunter, W. D. & Pierce. *Movement of the Cotton bollweevil in 1912. U.S. Agric. Supt. of doc.*

1913 MacConnell, J. W. *A century of fine cotton spinning. G. Falkner & Sons, Manchester.*

1914 Hutton, J. A. *The effect of the war on cotton growing in new fields. J. Heywood, Manchester.*

1914 MacConnell. J. W. *Commerce and Science in cotton growing. Manchester.*

1914 Roehmer, H. *Die Baumwollspinnerei in Schlesien. Darstellungen und Quellen zur schlesischen Geschichte.*

1914 Apelt, K. and Ilgen, E. *Die Preisentwicklung der Baumwolle und Baumwollfabrikate. Leipzic Verein für Sozialpolitik. Schriften B.D. 142.*

1914 Alford, G. H. *How to prosper in bollweevil territory. International Harvester Co.*

1914 Cook O. F. *New system of cotton culture and its application. U.S. Agric. Supt. of doc.*

1914 Cook, O. F. *Relation of Cotton buying to Cotton growing U.S. Agric. Supt. of doc.*

1914 Meadows, W. R. *Economic conditions in the Sea Island cotton industry. U.S. Agric. Supt. of doc.*

1914 Taylor, F. and Sherman, W. A. *Spinning tests of upland long staple cottons. U.S. Agric. Supt. of doc.*

1914 Thompson, E. W. *Cotton seed products and their competitors in Northern Europe. Pts. 1 & 2. U.S. Supt. of doc.*

1914 Cook, O. F. *Single Stalk cotton culture. U.S. Agric. Supt. of doc.*

1915 Balls, W. L. *Development and properties of Raw Cotton. A. & C. Black.*

1915 Todd, John A. *The World's Cotton Crops. A. & C. Black.*

1915 Chapman, S. J. *The War and the Cotton Trade. Oxford Pamphlets.*

1915 Pierce, W. D. *Descriptions of some weevils reared from cotton in Peru. U.S. Agric. Supt. of doc.*

1915 Wilkinson, F. *Story of the Cotton Plant. Appleton.*

1915 MacCutchen, G. *Case for Cotton. U.S. Univ. of Sc.*

1916 Dean, W. S. *Manufacturing tests of cotton fumigated with hydro-cyanic. U.S. Agric. Supt. of doc.*

1916 MacMurry, A. *Corn and Cotton. C. A. MacMurry Nashville, Tenn. U.S.*

1916 Taylor, F. and Dean, W. S. *Comparative spinning tests of the different grades of Arizona Egyptian with Sea Island and Sakellaridis Egyptian Cotton.*

1916 Thornley, T. *Cotton Spinning. Intermediate or Grade II. Scott, Greenwood & Sons. London.*

1916 Scherer, J. A. B. *Cotton as a World Power; a study in the economic interpretation of history. N.Y.*

1916 Coad, R. R. *Cotton Boll Weevil Control in the Mississippi Delta. U.S. Supt. of doc.*

1916 Taggart, W. S. *Cotton Spinning. Vol. III. Macmillan & Co. London.*

1916 Orton, W. A. *Sea Island Cotton. U.S. Dept. of Agric. Farmers' Bulletin 787.*

1916-17 Dudgeon, G. C. *History, development and botanical relationship of Egyptian Cottons. Egyptian Agricultural Products. Govt. Press, Cairo.*

1917 Ball, W. Lawrence. *Cotton. Dent's exploitation of plants.*

1917 Morgan, T. O. *Field Crops for the Cotton Belt. U.S. Rural Test Book Series.*

1917 Thompson, W. *"Doing Nothing" or Empire grown cotton for Empire manufacture. Manchester.*

1917 Todd, John A. *Cotton resources of the British Empire Dent's Staple Trades of the Empire.*

1917 Claxton, W. J. *Cotton and the Spinner.*

1917 Goulding, E. *Cotton and other vegetable fibres; their production and utilisation.*

1917 Earle, D. E. and Taylor, F. *Classification of American Upland Cotton. U.S.*

1917 Morgan, J. D. *Field Crops for the cotton belt. Macmillan.*

1917 MacGregor, E. A. and MacDonough, F. L. *Red Spider on Cotton. U.S. Agric. Supt. of doc.*

1917 Cates, H. R. *Farm practise in the cultivation of Cotton U.S. Dept. of Agric. Bull. 511.*

1917 Cook, O. F. *Extension of Cotton Production in California U.S. Dept. of Agric. Bull. 533.*

1917 Moore, H. L. *Forecast in the yield and the price of Cotton Macmillan Co., New York.*

1918 Bigwood, G. *Cotton. Staple Trades and Industries (with plates). Constable and Co.*

1918 Stine and Baker. *Atlas of American Agriculture. Part V. Sect. A. Cotton. Washington Gov. Printing Office.*

1918 *Cotton production in the U.S. Crop of 1917.*

1918 *Cotton production and distribution. Season, 1916 and 1917. Dept. of Commerce. U.S. Bureau of the Census. Bull. 135.*

1918 Pryor, W. L. *Length of cotton lint, crops 1916 and 1917. U.S. Dept. of Agric. Bull. 733.*

1919 *Report of the Indian Cotton Committee. Supt. Govt. Printing, Calcutta.*

1919 Macara, Sir C. W. *The Cotton trade boom, and some considerations for promoting a lasting industrial peace. Addendum to "Social and Industrial Reform," Manchester.*

1919 Todd, John A. *The world's Cotton requirements and the future supply. Textile Institute "Journal," Dec. 1919, pp. 338-348.*

1920 *Report of the Empire Cotton Growing Committee. (In the Press).*

INDUSTRIAL PUBLICITY SERVICE LTD.,
4, 5, 6 & 7, RED LION COURT, FLEET STREET,
LONDON, E.C.4.